THE IRON AGE

New York, February 26, 1920

ESTABLISHED 1855 VOL. 105: No. 9

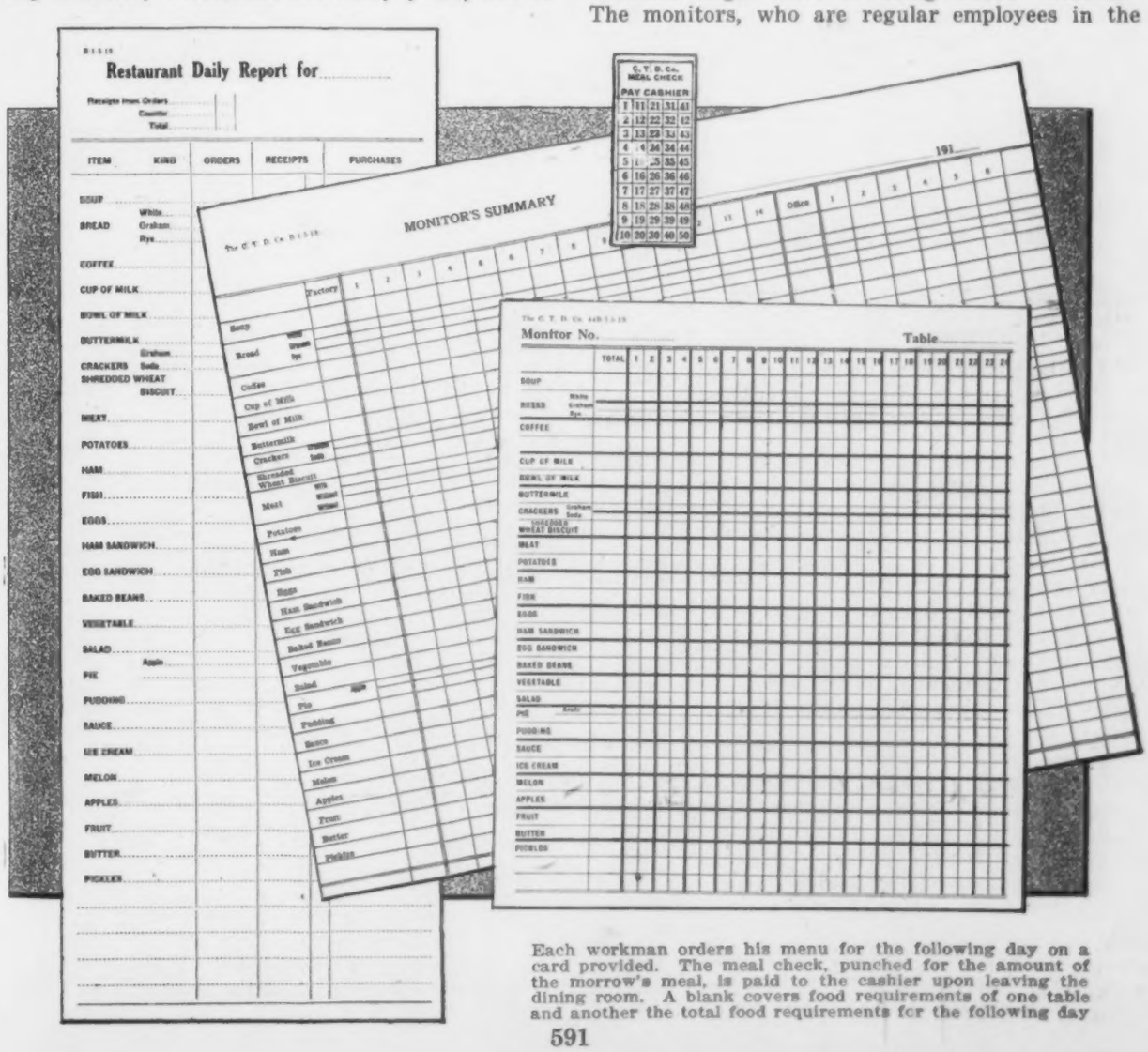
A Novel Employees' Restaurant Plan

Workmen at Cleveland Twist Drill Co. Order One Day the Meals for the Next—Management Loses on Food But Gains in Human Efficiency

BY F. L. PRENTISS

A NEW method of conducting a factory restaurant with a view of saving food and affording quick service has been adopted by the Cleveland Twist Drill Co., Cleveland. Under the plan the usual serve-self system of operating a restaurant that is in vogue in many factories has been discarded and a large amount of waste is avoided, due to the fact that patrons order one day what they will eat the next. This company has been conducting a factory restaurant for many years, but recently moved this to a new factory building, where it occupies the entire second floor, giving it a floor space of 100 x 120 ft.

The restaurant has a seating capacity of over 400, being provided with 24 tables, each with a seating capacity of 18. Each table and each seat is numbered and a patron always sits at the same seat. Each table is in charge of a monitor, so designated to avoid any objection that the attendants might have to being called "waiters." The monitors, who are regular employees in the



Each workman orders his menu for the following day on a card provided. The meal check, punched for the amount of the morrow's meal, is paid to the cashier upon leaving the dining room. A blank covers food requirements of one table and another the total food requirements for the following day

plant, leave their work 15 minutes before the lunch hour and serve the food to the tables, each man's order at his place so that when the men come from the factory they go directly to their seats at the tables and find their food waiting for them. In this way delays caused by getting in line and waiting to be served, as is required in a serve-self cafeteria, are avoided.

Copies of the menu for the following day, with prices, are posted on the building columns. These are in large letters and are so placed that a person sitting at any table can see one of them. During the lunch the monitor passes an order card around his table, on which the men order what they want the following day. This card is 7 x 8 in. in size and has on one side a printed list of all the items that are served. General terms are used for such items as meat and vegetables, the posted bill-of-fare showing the kind of meat or vegetable that will be served the following day. At the top of the card are numbers corresponding to the patron's number and each employee, as the card is passed to him, selects his lunch for the following day by placing a check mark in the column under his number and in the square opposite the item desired. The monitor places his own number and his table number, which correspond, at the top of the card and foots up the total order for each item given at his table. The monitor also foots up the amount of each patron's order as shown on the order card and punches the amount on a meal check which has spaces for punching sums from 1 cent to 50 cents. Each patron is given his meal check, and as he goes out pays the cashier for his next day's meal.

From the totals on the monitors' cards a daily monitors' summary is made up and from this a daily restaurant report showing the number of orders and receipts for each item and total receipts for the following day. A column is also provided on this daily restaurant report for purchases for the restaurant.

By following this plan the restaurant manager knows after each noon hour the total number of orders placed for each article of food for the following day and can buy accordingly. Practically all waste is eliminated, as only enough of the various articles of food are purchased or cooked to fill the orders. Consequently there is no surplus of good food to be consigned to the garbage cans, and the loss that is bound to occur from preparing too much of certain kinds of food when the serve-self plan is followed, is avoided.

In case an employee, because of absence from work one day, is not on hand to place an order for his next day's lunch, he is taken care of by ordering stock foodstuff, such as ham and eggs.

The restaurant is entirely under the company's management, but employees are invited to submit suggestions as to its conduct just as suggestions are welcomed from the men on matters relating to the manufacturing departments. One of the company's employees acts as manager, and buys the supplies. Competent cooks are provided, and all the food is first-class. The restaurant is operated at some loss to the company, which apparently does not try to make it self-supporting. However, no attempt is made to convey to the employees the impression that they are possibly getting a little more than they pay for even with the economical operation. The company feels that it is more than repaid for the loss in operating the restaurant by the increase in production after lunch-time by reason of serving good, wholesome food as compared with the work the men would do were they to eat cold lunches brought from home or the poor food supplied in some of the neighborhood restaurants. Another advantage of the restaurant is that it tends to promote among the employees a factory community spirit and loyalty to the organization. By the elimination of waste a good, substantial lunch, sufficient for a factory employee, and including soup, meat and potatoes, pie and coffee, is served at from 25c. to 30c., but office employees, who do not require so much food, usually spend a smaller amount. A typical bill-of-fare showing also the prices is as follows:

Bread, slice, 1c.; coffee, 3c.; cup milk, 4c.; bowl milk, 5c.; eggs, 6c.; ham, 9c.; ice cream, 8c.; ham sandwich, 5c.; egg sandwich, 8c.; butter, 1c.; mustard, 1c.; catsup, 1c.; vegetable soup, 4c.; hamburg steak, 9c.; stewed tomatoes, 4c.; mashed potatoes, 4c.; apple pie, 5c.; rhubarb pie, 5c.; peach sauce, 4c.; cider, 4c.

The restaurant is patronized daily by from 400 to 600 employees. The shop men go to lunch at 11:30 a. m. and the office employees from 12 to 1 p. m. As the men are not delayed in getting their food, they are usually through with their lunches within 15 minutes after they enter the room. During the noon hour the plant orchestra plays in the restaurant two or three days a week and a section is partitioned off on one side for a reading room. Also a small portion of the floor is used by the office employees for dancing during the noon hour.

While a regular factory store is not maintained, the company sells a few staple articles through its restaurant storeroom, and during the holiday time does a large business in nuts and candy.

Oil Fuel versus Coal, and Oil Fuel Equipment

A number of papers dealing with oil fuel were presented at the annual meeting of the American Society of Heating and Ventilating Engineers, New York, last January. Oil fuel versus coal was discussed by David Moffat Myers, consulting engineer, New York. He compared the relative cost of evaporation with bituminous coal, small anthracite, fuel oil and natural gas. A paper on oil fuel by F. W. Staley, engineer, the Texas Co., New York, discussed such questions as heat value, comparative costs of fuels, advantages of liquid fuel, storage, burning oil fuel, oil burners, steam consumption of burners, capacity of burners, furnace design, air supply, operation of burners, efficiency with oil, and land steam plants. Fuel oil equipment was considered in detail by John P. Leask, Gilbert & Barker Mfg. Co., New York. Copies of these papers can doubtless be had by addressing the secretary of the society, 29 West Thirty-ninth Street, New York.

Briggs & Turivas, iron and steel merchants, Chicago and New York, have created a specialization department which will have charge of purchases and sales of new, second hand or obsolete and salvage iron and steel products of all kinds. This innovation owes its existence to the belief of the company that it can materially enhance its service by dealing in equipment which is too valuable to be scrapped and can be used to advantage if brought to the attention of the proper consumers. A. J. Van Dell, formerly with the purchasing and stores department, Western Steel Car & Foundry Co., has been appointed manager of the new department, and will be assisted by W. G. Weiss, formerly of S. Ward Hamilton & Co., and C. T. Scott, formerly with the International Harvester Co.

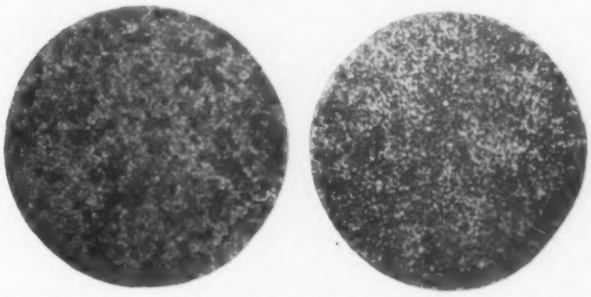
At Steelton, a suburb of Youngston, the Carnegie Steel Co. has completed an initial housing development for its foreign-born workers, consisting of 50 concrete houses built after the Van Guilder system. A large appropriation has been made for additional house construction this year at McDonald, the model town built by the company for workers at the McDonald bar mills, Trumbull county.

Effect of Pickling on Alloy Steels*

An Investigation to Determine the Degree of Interference with Quality and Machinability of the Material

BY H. L. HESS

PICKLING in the steel industry has become more or less generally associated with the immersion of certain articles such as sheet metal, coiled stock for drill rods or other purposes, wire, etc., into a bath made up of highly diluted sulphuric or muriatic acids. The use of the pickling tub is, however, not generally referred to in connection



Figs. 1 and 2.—Photomicrographs of the Interior Structure of an Annealed Chrome Steel. Fig. 1 is from an original of 100 diameters and Fig. 2 from an original of 500 diameters, both reduced about one-half. The etching medium was picric acid

with the manufacture of tool steel or the better grades of automobile and other alloy steels. These billets are, however, usually subjected to the action of a pickling bath directly or shortly after rolling from the ingot. In some cases this pickling is done while the billets are still hot but the more common practice is to permit an entire cooling before immersion in the acid. Pickling facilitates the inspection for seams and other surface defects, and successfully removes all furnace and rolling scale.

Various solutions are used. In the following tests one pound of a special pickling compound was dissolved in three gallons of water, this mixture being held at a constant temperature of about 200 deg. Fahr. As a result the relative importance or harm of any surface defects can not only be more accurately diagnosed, but the inspector can, with

Figs. 3 and 4.—Photomicrographs of an Unpickled Specimen, the Former at 100 Diameters and the Other at 500 Diameters, Both Reduced About One-half. They show clearly a decarburized zone along the surface. The latter reveals a layer of oxide or scale overlaying the surface

much greater assurance, pass on the steel as being [illegible] for satisfactory shipment.

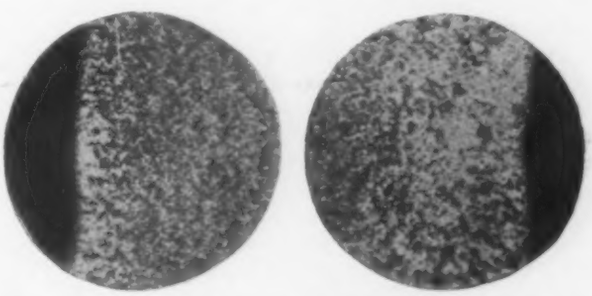
pickled billets, or blooms, are re-heated for [illegible] processing and the effect of pickling upon the surface of the steel has generally been considered as having been completely eliminated, as it has been fully established that a heating, or baking, of from 400 to 500 deg. removes any harmful influence of the pickling upon the surface of the steel.

Just what the effect is of pickling finished bars has been rather indefinitely understood. Some claim that a permanent harmful defect is set up but the general impression seems to be that in all probability the trouble from this cause is either nothing or very slight.

For the purpose of distinctly determining this point, a bar of 1½ in. round chrome steel, running approximately 1 per cent carbon and 1.50 per cent chromium, was cut into 16 pieces, each piece being 3 in. long. These pieces were then clearly marked for further identification. Previous to cutting, the bar had been thoroughly annealed to a Brinell hardness suitable for machining.

Two of these pieces were preserved in the original annealed condition and were not pickled. The remaining 14 pieces were grouped into 7 groups of two pieces each, marked Nos. 2, 3, etc., up to 8, and were immersed in the pickling solution for two hours. When removed from this solution they presented a perfectly clean surface, free from all scale.

As the object was to determine the lasting effect of such pickling on the metal, the following subsequent treatments were made to include widely vary-



Figs. 5 and 6.—Photomicrographs of Pickled Steel in Which the Layers of Scale or Oxide on the Surface Are Eliminated with Part of the Decarburized Zone Apparently Eaten Away. These are reduced one-half from an original diameter of 100

ing factors which might be considered as neutralizing or partly neutralizing the effect of the pickling:

Group No. 2 was washed in cold water immediately after pickling.

Group No. 3 was washed in hot water immediately after pickling.

Group No. 4 was immersed in lime water immediately after pickling.

Group No. 5 was washed in cold water immediately after pickling and kept for seven days.

Group No. 6 was washed in cold water immediately after pickling and kept for 14 days.

Group No. 7 was washed in cold water immediately after pickling and kept for 21 days.

Group No. 8 was washed in cold water immediately after pickling and kept for 28 days.

The pieces were then permitted to age, then dried in air and placed in a dry room for the periods mentioned above. They were then tested for hardness without, however, cleaning, polishing or filing the surfaces in any way previous to the hardness tests. This was done in order to avoid the possible removal of a skin which might have been affected by

*This article is based on work done by the metallurgical department of the Hess Steel Corporation, Baltimore, Md. The author is connected with the company.

the pickling. The hardness tests were made both by the Shore and Brinell methods, with the following results:

Group	Shore	Brinell
No. 1	18.0	151
No. 2	19.0	156
No. 3	19.5	158
No. 4	18.0	159
No. 5	18.5	153
No. 6	19.0	159
No. 7	18.0	156
No. 8	18.5	159

It is to be noted that the hardness results by either method do not seem to be affected by the pickling treatment. There is a slight indication that the unpickled steel has a somewhat softer surface, or skin, than the pickled specimens.

Careful machining tests showed absolutely no difference in machinability, the conclusion being that any additional hardness from pickling shows only as a skin condition not traceable in any additional cutting power required, or noticeable in connection with the necessary re-grinding of the cutting tools.

Further tests were made to find out, if possible, whether pickling would have any effect upon the surface of the material and whether this effect were noticeable to any appreciable depth.

It is know that steel when treated with diluted acids, such as sulphuric or hydrochloric, shows an evolution of hydrogen. This hydrogen is taken up freely by the metal and renders the steel very brittle as can be noticed with wire, where it has been found that wire which will bend 10 or more times without breaking in an unpickled condition will, after pickling, break after being bent two or three times. If, however, this pickled wire is baked at a temperature of slightly over 400 deg. Fahr., or permitted to age for a sufficient length of time, it can be bent freely without breaking. It is for this reason that wire is subjected after pickling to a lime washing, which is followed by heating to a moderate temperature.

In these tests each piece of steel was subjected to a careful microscopic examination of the surface before and after ageing, and at various magnifications. From the photomicrographs, it will be noticed that there is not a distinct difference between the pickled and unpickled bars.

Referring directly to these photomicrographs: Fig. 1 shows the interior structure of an annealed chrome steel of the above analysis, at a magnification of 100. Fig. 2 shows the same steel and section at a magnification of 500. Both are etched with picric acid. It will be seen that the structure consists largely of spherodized cementite, uniformly distributed throughout the entire mass, and representative of a correctly annealed chrome steel with a Brinell hardness suitable for machining.

Figs. 3 and 4 were taken at a magnification of 100 and 500 diameters respectively and show rather clearly a decarburized zone along the surface of the bar. Both of these are taken from an unpickled specimen. Fig. 4 shows the layer of oxide or scale overlying the surface which, as can be distinctly seen, splits apart the ferrite grains close to the surface by oxidizing the grain boundaries of the ferrite crystals. The total depth of the decarburized area, however, does not exceed 1/32 in. maximum.

In pickling the steel, the layers of scale or oxide on the surface are eliminated, and also a part of the decarburized zone has apparently been eaten away by action of the acid, as is shown distinctly by photomicrographs Figs. 5 and 6.

In every case, on examination under the microscope, an area was detected just below the decarburized zone, in which the pearlite is distinctly lamelar and in strong contrast to the spherodized pearlite as shown in Figs. 1 and 2. This lamelar pearlite is slightly more difficult to machine than the spherodized pearlite.

The general conclusions that might be drawn from these preliminary tests are that pickling in itself, as well as pickling followed by various treatments, does not interfere in any noticeable way with the quality or machinability of the steel.

Contracts for Steel Ships

WASHINGTON, Feb. 24.—Contracts for the construction of steel ships made with American shipyards during January include one by the United States Steel Corporation with the Chickasaw Shipbuilding & Car Co., Mobile, Ala. This company will build for the Steel Corporation 10 cargo carriers with a gross tonnage of 65,000 tons each. Four of them will have a speed of 11 knots and six of them a speed of 12 knots.

The records of the Bureau of Navigation of the Department of Commerce showed that on Feb. 1 there were 183 steel vessels of 791,911 gross tons for private shipowners under construction or under contract to build, compared with 165 of 679,170 gross tons on Jan. 1. These figures exclude all ships or construction on contract with the Shipping Board.

The shipyards which have the largest number of contracts for private interests include the Sun Shipbuilding Co., Chester Pa., which is building 20 ships, with a total gross tonnage of 149,790; the Federal Shipbuilding Co., Newark, N. J., which is building 18 ships, with a gross tonnage of 126,368, and the Bethlehem Shipbuilding Corporation, Ltd., which, at its Fore River plant at Quincy, Mass., is building eight ships, with a gross tonnage of 62,180; seven ships at its Sparrows Point plant, Maryland, with a gross total of 52,150, and seven ships at its Union plant at San Francisco with total tonnage of 49,050; four ships at its Harlan plant, Wilmington, Del., and three ships at its Moore plant, Elizabeth, N. J.

Coal Commission Hearing

WASHINGTON, Feb. 24.—Hearings have been concluded by the President's coal commission. The original date set for the submission of the report was March 1 and it is believed that findings will be made known not later than that date.

The final witnesses heard by the commission were representatives of the public utilities corporations, who explained the burden upon them by reason of the 14 per cent advance in miners' wages as a result of the passing along the increase to corporations which had contracts for coal made prior to Nov. 1, in which provision was made for increased prices as a result of wage advances.

A severe criticism of the Railroad Administration's coal car shortage was made before the commission by T. H. Watkins of New York, representing the Pittsburgh Coal & Coke Co. Mr. Watkins said that the failure of adequate car supply was an important factor in the price of coal on the market. Because of their inability to get cars when needed, he pointed out, many operators have been forced to run their mines at huge cost while not getting the coal to market.

The Hydraulic Pressed Steel Co., Cleveland, announces the consolidation of all its interests under the name of the Hydraulic Steel Co. The individual plants will be known as follows: Hydraulic Pressed Steel Co. of the Hydraulic Steel Co., Cleveland; Hydraulic Steelcraft Co. of the Hydraulic Steel Co, Cleveland; Cleveland Welding & Mfg. Co. of the Hydraulic Steel Co., Cleveland; Canton Sheet Steel Co. of the Hydraulic Steel Co., Canton. The executive offices of the company are in the Illuminating Building, Cleveland, with branch offices in New York, Chicago and Detroit.

A patent has been granted to Frederick Hiley, Waukegan, Ill., for a centrifugal valve casting machine, which he has sold to L. R. Wilder, president, Amalgamated Machinery Corporation, Chicago.

Business Opportunities in Asia

Harmonizing Exporting in Keeping with Oriental Traits and Trading Methods—Value of the Representative on the Ground

BY F. R. STILL*

F. R. STILL

THE opportunity to do business in Japan, North or South China, Indo-China, the Malay Peninsula, the Philippines, Burmah, Siam, Borneo, Sumatra, Java, Australasia, India and Ceylon varies in each of the countries named. The opportunity varies not alone as regards any one product, but it also varies as regards every American manufactured product.

An article which may be entirely acceptable in one country will not be so in another. Then again, there may be great business possibilities in one country which do not exist elsewhere; and very often, a method of doing business which in one country may have proven satisfactory will be entirely unsuited to another. It is much the same as selling to an individual in our own country, wherein we all know that a variety of sales methods have to be employed to sell any specific article to the different people we encounter in various localities and occupations.

Understanding Oriental Customers

To do a successful export business in any Oriental country it is positively necessary to go there, carefully study the conditions, learn the requirements, temperament, habits and customs of the people and formulate a sales policy which will harmonize with what they are accustomed to; otherwise the business will scarcely amount to much, and besides a lot of money may be wasted.

To anticipate that a large or successful export business may be built up, simply through representation by any one of the many exporting houses in our country, or by the importing houses in foreign countries, is sure to result in disappointment.

The only possible exception is the sale of standard staple articles for which there may always be a heavy demand beyond the natural sources of supply.

Importance of Resident Export Representative

No manufacturer of machinery or specialties can ever hope to make much progress without having a competent resident representative on the ground to assist an importing agency, no matter how large or experienced the agency may be.

Undoubtedly the best arrangement is to select a good live importing house, having ample capital, credit and an organization capable of handling the business, regardless of volume. With this house place a competent representative to look after the particular interests of the home office, who is to work with the agency staff along the lines which have proven successful in building up its general business. He must have a thorough knowledge of all branches of his own line, have the initiative to tackle any problem and be possessed of such judgment as will enable him to successfully handle the business independent of advice from the home office.

The distances are vast in those countries, transportation and communication facilities very limited and exasperatingly slow. Hence he must largely rely upon his own resources and be prepared to act promptly, decisively and correctly without guidance. Naturally this calls for a man of exceptional experience and ability. Because such men are hard to get they are not usually sent to the Far East, and that is why so many concerns are not satisfied with the results they get from their efforts to build up an export business.

Knowledge of Country and Living Conditions

To make clear why these statements are true, let us consider, first, North China, say from Shanghai north to Siberia. Along the southern section of this area lies the great fertile Yangtse Kiang valley, extending west over 3000 miles. The tributary rivers are navigable for more than 1500 miles, passing through the most highly productive agricultural district imaginable. All kinds of minerals abound north and west of this valley. It is reported that about one-eighth of the world's coal supply is available in this part of China alone, of which less than 1 per cent has been developed.

There is ample labor available and of a class of intelligence far above that possessed by most of the immigrants who come to this country from Europe. The people can be taught to do anything and are possessed of a natural skill which readily converts them into finished mechanics or artisans in a very short time. It is their natural bent to do nice, neat work on anything they undertake. The greatest fault found with most of them is that they are too painstaking, thereby slowing up production when engaged in reproductive manufacturing pursuits.

Excepting in the treaty ports, of which there are perhaps a dozen, the people live in a primitive manner, not much different than they did a thousand years ago. Their wants are few. In the summer the people go almost naked and in some sections the men do go entirely so. None of them wear boots or shoes, such as we are accustomed to. Woolen clothing has never been worn; only cotton and silk. In the cold, northern parts of the country they pad their clothing and wear several thicknesses in winter, binding their feet in gunny-sacking, tied on with bamboo reeds.

None of them have stoves or furnaces for heating their houses, as fuel is too scarce to afford such a luxury. A brick furnace is built for cooking and the smoke flue is carried under a "kang" or bed which is usually about 9 x 12 ft. and built of brick. This "kang" radiates all the heat ever provided and the whole family sleeps on top of this brick bed. The fuel is usually nothing more than dried stalks, weeds, leaves, etc., gathered from the fields, as there is no wood in China and very little coal is mined.

South of the Yangtse Kiang valley the climate is so mild that heat and clothing for human comforts are not required. Shanghai is in about the same latitude as New Orleans, while Hong Kong

*Vice-president and secretary American Blower Co., Detroit.

and Canton are on about the same parallel as Vera Cruz, Mexico.

Exporter Rarely Sells Direct

When working up trade in China, the manufacturer, jobber, exporter or importer seldom, if ever, comes in contact with the purchaser or ultimate consumer. Practically all business is done through a "comprodore," who is usually a highly educated Chinese business man of means. He assumes all financial responsibility and guarantees that the customer will pay for the product according to the contract or he will bear the loss. The comprodore employs a number of Chinese salesmen or "scouts," who usually bring him in contact with the prospective purchaser. The house does all the engineering work, writes the specifications, makes the estimates and draws up the contracts. The comprodore acts as the interpreter and intermediary, being in fact the salesman. He is paid a commission on all sales and in turn divides what he gets with his scouts.

Few Chinamen will deal direct with a foreigner at first. It is a Chinese idea that to approach a dealer for quotations indicates a desire to purchase which will preclude getting the best price. Two Chinamen know one another's tricky ways perfectly and can bargain and haggle over little things for days with the keenest enjoyment, but which would drive an Occidental crazy. Our definite, direct and impatient ways of doing business are not understood by any of the Oriental races, which, if for no other reason, makes it necessary to employ very different sales methods than are used in Europe or America. Hence the "comprodore" system, while vicious in some respects, is apparently the best adapted to the peculiar characteristics of the people in that part of the world.

The comprodore system prevails all over China and is more or less in vogue all over the Far East, especially where there are many Chinese. Most of the houses in India have a comprodore, also in Java and Sumatra. Even the European banks in China depend entirely upon a comprodore and a Chinese "shroff" passes on all papers and currency.

Some houses have both an import comprodore and an export comprodore; then some have one or both in every branch office and a head comprodore at the main office.

Constant Fluctuation of Silver Currency Value

The currency all over the East is on a silver basis. For many years previous to the war the fluctuations of exchange values were very small; hence, except in cases involving very large amounts of money the difference was not of serious importance. But since the war, silver has been climbing steadily until now it is worth more than gold. While climbing upward, it has frequently advanced two or three cents one day and then has fallen back one or two cents the next; occasionally it jumps six to ten cents a day, one way or the other. This has made necessary an entire change in the methods of banking and in the carrying of bank accounts. Every house now employs a "shroff," whose sole business is to watch the silver market. He carries an account in one of the banks of every nationality represented in the country, like England, France, Belgium, Russia, India, Japan and America. As the exchange quoted by these different countries varies from day to day or even hour to hour, he draws from one bank and deposits in another.

There are no clearing houses in any of the Oriental cities. There are no national banks; most of the various governments do have banks of their own and issue their own currency, but usually the latter is circulating under a heavy discount. The currency issued by the foreign banks is generally the standard medium of exchange all over the East. It is a badly jumbled up mess and affords a fine opportunity for a loss of money through trickery, fraud, accidental oversight, or knavery. With half a dozen or more standards of value, all wildly fluctuating and no two fluctuating alike, they can produce ample confusion to satisfy the most satiated gambler if he is looking for excitement. But for a business house to attempt to contend with all these difficulties by direct representation through its own organization and expect to do a satisfactory business, anywhere near commensurate with the expense incurred, can only result in sore disappointment and eventual disgust with foreign business in every form.

If a manufacturer does not place a competent man with a foreign importing house, as hereinabove suggested, it is doubtful if much continuous business will be done, no matter what kind of a follow-up system be employed. Such importing houses handle so many things that it is more than can be reasonably expected that all of the lines will be given proper attention and all be pushed as they should be. Naturally such things as are in the biggest demand, which carry the most profit and which are the most easily handled will get the most favorable attention; conversely, those things requiring careful attention, involving considerable risk, and which have to be forced in order to move them will only receive attention when a customer inquires about them, and even then will seldom be given the enthusiastic sales effort they would receive from a representative direct from the manufacturer.

Selling Occidental Goods the Oriental Way

Many interesting examples might be recited showing how the simplest things sometimes upset business dealings most disastrously. It is absolutely necessary to thoroughly understand and be guided by the fact that most of the Oriental races are uneducated, are bigoted, obstinate, prejudiced and superstitious; they are perfectly satisfied with their mode of living; they do not want much and what they get they want of a kind they have been accustomed to getting for generations.

Hence, to try to change their ways so as to conform to our ideas is just as futile as to attempt to alter the action of the tides. We must learn what they want, how they want it, and then provide it just as cheaply and uniformly as possible; we must carry on all business transactions in their way, expecting nothing unusual in the way of honesty or dishonesty from them and employ the same business methods for protecting our interests that we employ at home. If we follow these lines nothing can prevent the doing of a satisfactory foreign business in all lines, where there is a demand for goods offered for sale; and with close attention to the business, good goods, honest treatment and good service, it will grow continuously.

Mahoning Valley interests have acquired the coal holdings in Belmont county, Ohio, of the Industrial Coal & Coke Co., Steubenville, comprising 2344 acres for a reported consideration of $1,250,000. The Uniontown Coal Co. is being formed at Youngstown, Ohio, by J. C. Irwin, J. H. C. Lyon and others to take over and operate the properties. The acreage is divided into 1600 to 1700 acres of deep mine coal and 600 acres of coal which will be removed by stripping.

Storeroom Equipment and Its Use

Economy of Flexible Steel Furniture—Mechanical Aids in Counting and Weighing—Periodical Inspection of Appliances

BY H. B. TWYFORD*

LARGE sums are expended by industrial plants in developing, perfecting and improving production machinery and tools in the shop; but generally too little attention is paid to the proper housing and arrangement of the stores. In the last analysis the final cost of products must include the cost of storing. It is therefore just as essential to keep the cost of handling material in stores at the minimum. Prodigality in one department and a parsimonious policy in the other can only lead to unbalanced results.

Proper equipment is conducive to the prompt handling of material as it arrives in the storeroom, and this is an essential feature of successful storeskeeping.

Accurate Counting of Very Small Articles Is Quickly Accomplished By Setting the Tare on One Weighing Beam, Counting Out a Unit Lot Into One Scale Pan, Pouring the Uncounted Lot Into the Other, Adjusting the Ratio Member to Balance and Reading the Quantity Indicated By Pointer on the Counter Bar

Using Stores in the Sequence Received

When a requisition is received it is a natural thing in making the delivery to take the goods from the nearest or most accessible place; but with some kinds of material the older should be given out first. At any rate, it is a good rule to deliver all material in the sequence in which it was received. Those stores that are in constant demand should be placed in convenient locations. Heavy material should be stored at a convenient height for loading onto trucks.

Great care must be exercised in placing articles in their designated places. It is just as bad to dump some ¼-in. nuts in a bin containing 5/16-in. nuts as it is to make an entry in the sales ledger against the wrong customer. It is probably worse, for it is likely to lead to more confusion. The mixing of the wrong sizes or of the same sizes of different grades is one of the most prevalent faults in storeroom routine.

Another common mistake is having more than one shelf or bin for the same articles. Adjustable racks, bins and shelving would do away with this, because the receptacles can be expanded or contracted at will to meet the requirements. The use of more than one location tends towards the accumulation of shelf-worn or old stock, because the nearest receptacle will invariably be approached first and the more remote one neglected. Multiplication of places for storing the same articles leads to errors, because it gives the stockkeepers more things to remember.

The value of every foot of storage space should be accurately determined, and the greatest advantage of this space can be obtained with flexible steel equipment. With this it is possible to do almost anything in the way of extending or contracting the receptacles formed by them. If, for instance, several sizes of rivets are being carried and it is desired to discontinue one size or add one, either change can be made without disturbing the proper sequence of sizes and usually without much disturbance to the existing stock.

Steel equipment can be had in many forms. In some stores it may be necessary to use lockers for small and valuable articles, and in some instances special construction of bins may be required, but as a rule most of the material kept in bins or racks can be stored in one of three types. These are known as the closed type, open type or rack type of receptacle. These can be arranged every 3 in. vertically and approximately every 6 in. horizontally. The partitions or dividers provide for the greatest economy of available storage space. It is computed that their use effects a saving in storage space of 30 per cent over ordinary wooden bins and shelving. Any handy man with only a screw-driver can assemble and erect them, or make any changes to accommodate variations in stock.

Ladders made for operation through the center of the aisles are particularly useful where shelving is carried to the full height of the room. They have a double overhead track, which elimintes any possibility of the ladder tipping when heavy loads are lifted from the shelves on either side. The flexibility of the connections and the self-adjusting top fixtures have several excellent features. They permit the weight of the ladder and the load on it to be carried by the floor, and not by the ladder connections.

The Counting Problem

Even when goods are weighed or measured they invariably have to be counted. For example, 20 bbl. of material may be received. The material is checked by weight, but the number of barrels has to be counted. This is an extreme illustration the antithesis of which would be 20 bbl. of very small articles which must be counted. The first instance is a simple mental count, but the latter could not be done accurately except with the aid of some mechanical contrivance. Counting is

*Purchasing agent, Nichols Copper Co., Laurel Hill, Long Island, N. Y.

the biggest problem in receiving and delivering articles from stores which contain large numbers of small pieces.

It must first be recognized that the masses of things in a storeroom come in like units or in units so alike in weight and size that the variations can be neutralized on a bulk machine count. Consequently the great

Weighing and Counting Articles By the Barrel

problem is one of counting with the least expenditure of time and labor.

The counting methods now in use can be logically divided into five separate systems:

1. Hand counting: This needs no explanation.

2. Counting by weight and estimate: Any ordinary scale can be used. The weight is first obtained of a given number of articles, preferably an even number for the sake of rapid calculation. For example: If 20 articles weigh 50 lb., then 500 lb. would represent 200 articles.

3. Even balance counting: This commences by deciding on some number as a base. For instance, if 100 is the base number these are counted by hand and placed on the tray on one side of the scale. A quantity is then placed on the opposite tray or receptacle until an even balance is struck. The two together total 200 pieces and these can be evenly balanced, giving a total of 400 pieces. This can be continued indefinitely until the quantity remaining is too small to create a balance. Hand counting must then be resorted to.

4. Counting with proportional scales: The scales used are arranged to work according to certain set even ratios, usually ranging from 10 to 1 up to 200 to 1. A scoop hangs from the end of the scale beam serving as the counter-poise. With a ratio of 10 to 1, then, 100 small pieces in the counter-poise scoop will balance 1000 similar pieces on the platform. Without further adjustment of beam or counter-poise scoop it is then possible to count out as many lots as desired by simply repeating the process of loading the platform to the balancing point.

5. Automatic counting: The methods already described are all in use to some extent; but they have been very briefly explained, because they do not represent the latest developments in counting. It is necessary, however, to know something of them for the purpose of comparison with automatic counting.

Counting Machines

Counting machines give an accurate and quick count of any commodity, consisting of similar parts or pieces, without the use of tabulated figures of weights, mental calculation, or any figuring. The total count of the contents of any box, barrel, bag, truck, or barrow containing an unknown number of like parts or pieces can be determined accurately and almost instantly.

There is no chance for confusion of figures, errors in estimates, or defective calculation, as the accuracy of the count is governed mechanically. Mental fallibility is eliminated and from 50 to 90 per cent of time and labor is saved over every other known method or device employed for counting. The method is one of ratio weight, scientifically applied in a machine of few parts, which any ordinary laborer can operate and understand. While knowledge of the weight of the material handled is at no time a feature in obtaining count, yet whenever it is so desired weight and count may be secured at practically one operation. These machines are indispensable when taking inventory. The counting bars on the machine can be graduated to meet any requirements. For example, the counting can be done by the dozen, gross or hundred.

These machines have the usual small scoop to take the ratio count of pieces, but this scoop or ratio pan slides along the counting bar, instead of resting in a fixed position on the counter-poise. To obtain the count of an unknown quantity of pieces with the counting machine, the tare of the package of contents is set out on one of the weighing beams, of which there are usually two. From the contents of the package the number of pieces required for the ratio pan are taken out; the number required for this purpose is indicated on the counting bar. The ratio is then moved along the counting bar until the beam is in balance. A pointer indicator immediately above the ratio pan then denotes on the counting bar the exact number of pieces resting on the platform.

Where it is desired to count in certain specified lots, say 144, the tare of the package is set out as above indicated, the pointer indicator is set against the 144 mark on the beam, and the package is then loaded until the beam balances.

These counting machines are made to cover practically any known requirements. They range from delicate machines, which will record the count of pieces so small that it takes 25,000 to equal 1 oz. to the heavy dormant type of machine which will count pieces weighing a ton There is certainly no room for comparison as to speed, simplicity, or automatic accuracy between the results obtained with these machines and from any of the more antiquated methods. Why should we have adding machines and similar devices in the office and no mechanical devices in the storeroom? Each is an attempt at the solution of the problem of obtaining a maximum saving of time and of mental and physical energy by some automatic mechanical means.

Weighing Machines and Scales

Too little attention has been paid to securing proper weighing apparatus for storerooms. When purchasing new scales and weighing machines the storekeeper should carefully investigate the machines which appear to meet his needs. The mechanical construction and reliability under service conditions should be tested. It is not an uncommon practice to make out a requisition for a balance scale, platform scale, fixed or portable, as may be desired, and then let the purchasing agent buy the cheapest article which will meet this crude specification. The storekeeper, however, should have a deciding voice in the selection.

Inspection of Stores Equipment

It is important that periodical inspection and testing of all weighing machines be made. This can be arranged with the manufacturers and will ensure accuracy at all times. As an illustration of this the author had reported to him three consecutive shipments of copper from a large supply house, all of which were short in weight. It was found on investigation that the supply house had not had its scales tested for a long period. They discovered on examination that some registered over-weight and short-weight.

It is equally essential to have correct weights in a storeroom. This is particularly important when small parts are being made. For example, if a storekeeper receives a requisition from the shop for 200 lb. of brass tubing and his scales are wrong to the extent of 1 per cent, plus or minus, there will be a very radical

discrepancy shown at the end of a year if similar requisitions come in frequently. This will affect not only the storeroom, but the cost department will also be in error to the extent of the same extra waste of material.

There are many types, styles and sizes of trucks made, all of which have their specific uses, but the elevating or lifting truck could with profit be substituted in the majority of cases where the old style of fixed platform truck is still in use. The separation of the running gear from the platform has revolutionized transportation in stores.

Complete accuracy in the manual operations of a storeroom would be exceedingly difficult to maintain without cleanliness, orderly arrangement of the stock and general tidiness. These must be enforced. With these conditions, coupled with efficient mechanical devices, well arranged bins, shelves and receptacles, and finally with alert, capable and willing helpers, not much will go wrong with storeroom operations.

Effective Annealing of Metal Products

Benefits from the Use of a Special Powder as a Cooling Medium—Practical Examples

BY L. R. W. ALLISON

IN annealing pits for casting work, it is customary to use a bed of a suitable inert substance such as oxide of iron, sand, fire clay, graphite, hydrated lime or the like, in accord with the particular nature of the material to be handled. In the past few years a new product has come into extensive use for this service, known as Sil-O-Cel powder. It has been shown that a wide range of production can be handled in a highly effective way in annealing pits filled with this material, including steel castings, malleable iron castings, general castings and forgings, tool steels, high-speed steels, chrome-vanadium alloys and so on.

One of the Larger Brick Furnaces Filled with Sil-O-Cel in Which the Castings Are Imbedded for Slow Cooling

One of the early references regarding the value of this powder for annealing service occurred in a contribution to the Steel Treating Research Society and was published in the proceedings of this organization. This covered a brief notice dealing with the annealing of nickel steel under the title, "Easy Annealing Method," as follows:

> Instead of packing the steel parts for annealing, try the following: Heat above critical, or use hardening temperatures, in furnace (open fire annealing) and drop into Sil-O-Cel powder. This powder is so light that steel parts dropped into it will bury themselves. Keep powder in thin iron pots or containers and line with asbestos paper. From 12 to 24 hr. are required for parts to cool for handling.

Sil-O-Cel is prepared in different commercial forms from a basic product known as celite; it is highly siliceous in nature, very light in weight and possesses exceptional properties of non-conductivity. In the form of an insulating brick, the material weighs from 25 to 30 lb. per cu. ft., while when ground into powder, it has a weight of but 8 lb. per cu. ft.

The product is composed of numerous hollow cells. Being almost pure silica, it has a high melting point, determined by the United States Bureau of Standards as 2930 deg. Fahr. (1610 deg. C.). It will withstand safely 1800 deg. Fahr. direct heat without-shrinking. Beyond its service for annealing heat-treated metal products, this material is valuable also in other phases of foundry work, such as for annealing furnaces and ovens, oven doors, and the like.

General Annealing

The annealing operation in general is carried out by heating the products to the required temperature and then cooling them in a pit of convenient size, filled with this powder. Such an annealing bed in service is shown in one of the illustrations. The pit is constructed of fire brick to such depth as required and to a height of about four courses of brick above the floor line. The annealing pit is directly opposite the furnaces, with a traveling crane available for conveying heavy parts from the heating furnaces to the powder bed.

In operation the heated metal product is immersed in a bath of the powder ranging from 6 to 8 in. in depth and deeper, depending upon the size of the casting and the rate at which the cooling is to be effected. After the required cooling point has been reached, the product is removed from the bath and worked in subsequent operations in the usual way. The rate of cooling, as will be understood, is dependent upon the depth of the powder and the construction of the pit. The lightness of the powder permits the heavy metal parts dropped into it to bury themselves rapidly where the bed will allow. To facilitate the handling of small castings and forgings, the powder can be used in small iron pots, boxes or other containers, as indicated in one of the illustrations. As in the case of the larger parts, the castings are dropped into the bath after being heated in the furnace and allowed to cool. The powder is removed readily from the part as it is taken from the pit by simply brushing the surface, making it immediately available for machining or other operation.

Use of the Powder in Small Boxes, Where Only a Few Products Are Treated

This powder can be used indefinitely for annealing work. There are plants to-day which are utilizing supplies that have been in service for two years or more, with the material changing in color from its original white to a reddish pink. In this, it is stated by users, the powder bed really grows better and more effective in its ability for annealing work as the term of service expands, the moisture in combination being

driven off and the resultant dryness enhancing the working value.

Beyond this feature of economy, the powder makes for slow and absolute uniformity in cooling, eliminating any cooling strains on the parts annealed, with freedom from hard spots on the product. Moreover, it prevents the formation of any scale blemishes incident to the oxidation of the heated part, and in the case of medium carbon chrome steel parts, it bars serious cracking of the material. The use of this powder also eliminates any necessity for reheating the furnace, allowing for continuous use of equipment with conservation of fuel and increased output.

Its Utility for Different Products

To afford a comprehensive idea of the use of Sil-O-Cel powder in various mechanical plants and its service for annealing products of different character, the following is cited: At a large works manufacturing differential gears for automobiles, various gear forgings are annealed, heating the parts to the required temperature and placing in a bed of the powder until cold. Different tools and tool steels are annealed in the same way, utilizing the powder instead of mica dust. For chrome-nickel steel gears, this company uses a pit 8 ft. wide, 20 ft. long and 24 in. deep, constructed of fire brick laid so as to give a wall 4½ in. thick. Gears of this type are left in the powder bath from 18 to 24 hr. and are then removed thence for the machining operations.

A New England machine tool plant, specializing in the production of automatic screw machines, uses a bed of this powder for treating carbon and high-speed steel castings. In this the material is heated to the proper temperature in the furnace, under open fire annealing, and buried in the powder. It requires about 24 hr. for parts of this nature to cool. Chrome-vanadium steel, intricate parts, clutches and kindred specialties are being handled with great success in these powder pits at this plant. At one time charcoal was used, but caused quite a little trouble.

The annealing both of iron and steel castings is being carried on in a Western iron and steel works by the use of this powder. Castings weighing from 30 to 80 lb. are treated in this way, entirely covered with the material to provide gradual cooling. Parts heated to 1600 deg. Fahr. are cooled in these pits and perfectly annealed. Beds as large as 5 ft. or more are in service, conveniently located so that overhead traveling cranes can drop the heated parts rapidly. Hydrated lime and graphite were used previously at this plant or similar service.

Another plant, devoted primarily to the repair of broken machine products under an acetylene weld system, is using the material for annealing with highly efficient results. The work includes such parts as gears, cylinders, machine frames, general castings and the like.

Other uses of the powder have been brought out in connection with drop forge plants working on alloy steels; here the product as it comes from the hammer is thrown into a pit of this material. With the accompanying slow cool, a fine machinable forging is obtained. Again, producers of steel products employ the powder in soaking pits and for annealing between rolling or other mechanical operations which cause strains in the steel and are relieved only by means of a slow anneal.

Lake Superior Iron Ore Shipments

Compilation by *The Iron Trade Review* of the official reports on the shipments of iron ore from the Lake Superior district in 1919 shows that a total of 48,812,522 tons were moved.

In 1918 62,836,172 tons were shipped and the decrease in 1919 therefore amounted to 14,023,650 tons. The high peak of Lake shipments was 66,658,466 tons, in 1916. There was a reduction of 17,845,944 tons from that figure in 1919.

Lake shipments in 1919 totaled 47,177,395 tons, as compared with 61,156,732 tons in 1918, a decrease of 13,979,337 tons. The total all-rail movement was 1,635,127 tons against 1,679,440 tons, a loss of 44,313 tons. The all-rail movement in 1919 was the smallest since 1915, and 302,975 tons less than the record all-rail movement in 1917.

Shipments by Port and All Rail, Gross Tons

	1919	1918	1917	1916	1915	1914
Escanaba	4,963,358	6,774,969	7,156,854	7,457,444	5,649,289	3,664,451
Marquette	2,132,935	3,457,054	3,207,145	3,858,092	3,099,589	1,755,726
Ashland	5,915,383	7,565,608	7,597,841	8,057,814	5,146,772	3,363,419
Two Harbors	6,424,545	8,723,472	9,990,901	10,735,853	8,642,942	5,610,262
Superior	10,919,965	14,068,341	13,978,741	12,787,046	8,342,793	11,309,748
Duluth	16,826,209	20,567,288	20,567,419	21,837,949	15,437,419	6,318,291
Total by lake	47,177,395	61,156,732	62,498,901	64,734,198	46,318,804	32,021,897
Total by rail	1,635,127	1,679,440	1,938,102	1,924,268	953,947	707,829
Total	48,812,522	62,836,172	64,437,003	66,658,466	47,272,751	32,729,726

Shipments by Ranges, Gross Tons

	1919	1918	1917	1916	1915	1914
Mesaba	31,997,699	40,396,711	41,445,211	42,525,612	29,756,689	21,465,967
Marquette	2,992,212	4,354,297	4,874,150	5,396,007	4,105,378	2,491,857
Menominee	4,442,868	6,378,698	6,045,750	6,364,363	4,982,626	3,221,258
Gogebic	6,230,839	7,936,701	7,981,684	8,489,685	5,477,767	3,568,482
Vermillion	929,049	1,192,908	1,530,692	1,947,200	1,733,595	1,016,993
Cuyuna	1,859,865	2,478,800	2,422,884	1,716,218	1,136,113	859,404
Mayville and Baraboo	359,990	98,057	136,632	219,381	80,583	105,765
Total	48,812,522	62,836,172	64,437,003	66,658,466	47,272,751	32,729,726

Machinery Conventions at Atlantic City in May

Four machinery conventions will be held at Atlantic City, N. J., the week of May 17. The American Supply and Machinery Manufacturers' Association, the Southern Supply and Machinery Dealers' Association and the National Supply and Machinery Dealers' Association will meet jointly on Monday, Tuesday and Wednesday, May 17, 18 and 19, and the National Machine Tool Builders' Association will hold its spring meeting on Thursday and Friday, May 20 and 21. The three associations first named will meet at the Marlborough-Blenheim Hotel and the latter at the Hotel Traymore.

N. R. Sinclair, president, announces that the name of the Militor Corporation, New York, has been changed to Sinclair Motors Corporation.

The Sharpsville Boiler Works Co., Sharpsville, Pa., has increased its capital stock from $100,000 to $400,000.

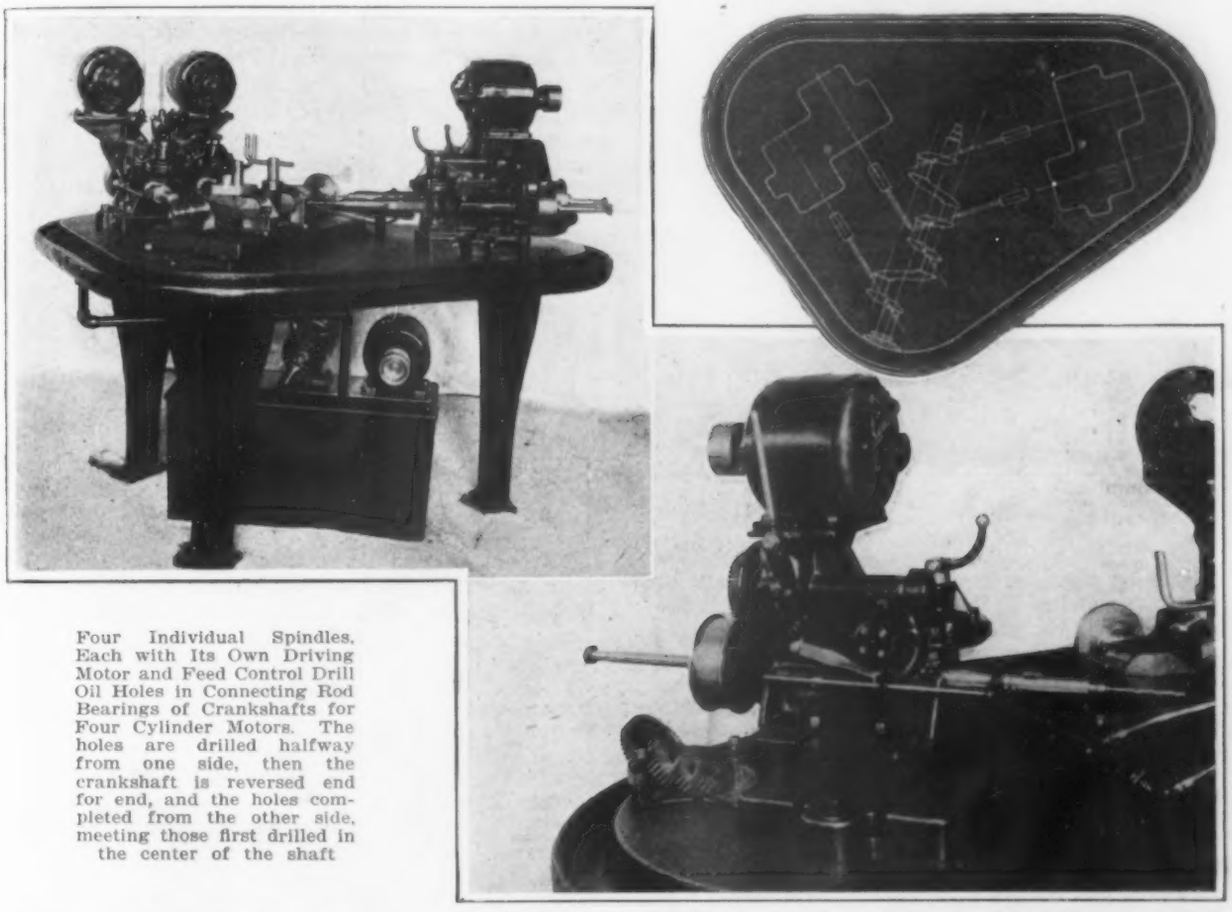
Smith & Serrell have moved their offices from New York to 44 Central Avenue, Newark, N. J.

The function of oil burners in the operation of furnaces is discussed in a pamphlet being distributed by W. S. Rockwell Co., 50 Church Street, New York. This is a reprint of a paper presented before the convention of the American Steel Treaters' Society, Chicago, in September, 1919.

Special Horizontal Spindle Drilling Machine for Crank Shafts

A horizontal spindle machine for drilling oil holes to the connecting rod bearings of automobile crank shafts is shown in the accompanying illustration. It was manufactured by Edwin Harrington, Son & Co., Inc., Philadelphia, and was designed for a motor manufacturer who had several sizes of shafts to drill requiring flexibility of spindle location and sufficient drilling power to insure high production.

Four individual spindle heads are used, each with its own driving motor and feed control. They are mounted in pairs on plates which permit variation of distance between spindle centers, variation of distance between the spindle nose and the work, and change of angle. The length of the spindle feed is sufficient to drill all the way through the average crank shaft, but as two holes usually intersect at the center bearing, and as long drills are objectionable, it is better to divide the cut by drilling successively from two sides. After the holes have been drilled half way from one side the crank shaft is reversed end for end, which brings it into proper position to have the holes completed from the other side, meeting those first drilled in the center of the cranks.



Four Individual Spindles, Each with Its Own Driving Motor and Feed Control Drill Oil Holes in Connecting Rod Bearings of Crankshafts for Four Cylinder Motors. The holes are drilled halfway from one side, then the crankshaft is reversed end for end, and the holes completed from the other side, meeting those first drilled in the center of the shaft

The spindle heads are made only for motor drive to avoid any difficulty of providing for belt drive in various positions. Belted connection is made from the motor to the spindle pulley with the tension taken by ball bearings on the pulley hubs. As only a single spindle speed is required, the motor can be of the constant speed type, for either direct or alternating current. Permanent changes of speed can be made by changing the size of the motor pulley.

The spindle runs in a long sleeve, having a bearing for its full length, which is advanced out of the head by its steel rack and pinion for spindle feed. A ball race at the forward end takes the drilling thrust and a flange attached to the end of the sleeve carries the trip rod. A 5/16-in. hole is drilled for the entire length of the spindle to provide for the use of oil feed drills if desired.

The feed is driven from the spindle pulley by spur gears so arranged that the driven gear may be changed to get different rates of feed. Two pairs of triple thread steel worms and bronze gears, each with a ball thrust mounting, drive the rack pinion. A clutch is provided between the spur gear and the first worm to disengage the power feed either manually or automatically at any predetermined point. Also a lever on the upper end of the rack pinion operates a clutch for connection with the worm gear and provides means of moving the spindle at one handling.

The plates upon which the heads are mounted are provided with T-slots to allow movement of the heads to change the distance between centers, and are located on the table by a center stud with holding-down bolts in slots at the ends. Provision is made for locating a taper dowel pin in a separate hole for each size of crank shaft. The location of the plate on the table and the shape of the table itself are subject to change to suit the job under consideration.

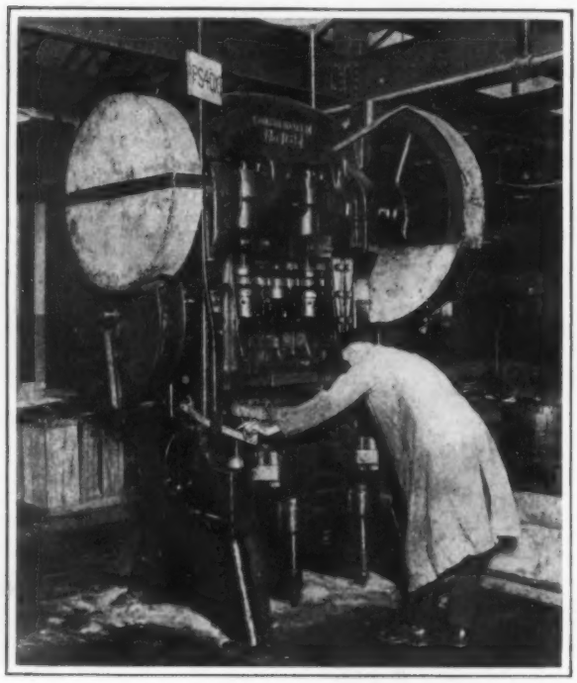
The tank and two pumps for cutting lubricant make a separate motor driven unit to be placed on the floor beneath the machine. The end pump delivers oil at the point where the drills enter the bushings and the pump in the center is provided for a supply through flexible tubes to a fitting on the outer end of each spindle when oil feed drills are used.

Frank D. Chase, Inc., industrial engineers, Chicago and New York, have inaugurated the publication of a house organ, called *Industry*. The prime purpose of the journal is to keep the growing organization knit together as closely as possible, but some copies will also be distributed among clients and friends. The first issue contains a number of articles written by members of the engineering staff, as well as several photographs showing the progress of a large project undertaken by the Chase firm.

Norton Service is the subject of a loose-leaf booklet which outlines the service, employment, medical, safety, recreation, co-operative gardening and housing activities of the Norton Co., Worcester, Mass.

Lever Safety Attachment for Side Presses

The accompanying illustration shows a motor-operated side press in use in the machine shop of the Square D Co., Detroit, which is provided with an effective safety device for protecting the hands of the operator. The press is actuated by a tread or lever, which throws the clutch. Without the safety device the operator while operating the press with his right



Both Levers, One for the Right Hand and the Other for the Left Hand, Must Be Held Down to Throw the Clutch on This Side Press

hand may unconsciously fail to remove his left hand from the metal he has placed on the die and thus lose his fingers or perhaps his entire hand when the press closes. To prevent this inadvertency a lever is provided also for the left hand. This is connected in the rear of the press to the right-hand lever by means of a rod. Both levers, right and left handed, must be held down at once to throw the clutch. To press but one only raises the opposite lever and allows the clutch to slip. The operator is compelled to keep both hands out of danger in order to operate the press.

This side press, as shown, stamps, presses, perforates and fashions sheet-steel into boxes which are used to enclose the live parts of electric switches—a protective device for household and industrial users of electric current. The switch is also shown in the illustration.

Use of Box Cars

CHICAGO, Feb. 23.—Numerous protests, emanating particularly from building contractors, have been voiced against what has been termed an "embargo" on the use of box cars. Beginning Feb. 8, and effective until Feb. 18, inclusive, the railroads in the grain states were required to give preference and priority in the furnishing of box cars for bulk grain, after providing for the loading of less-than-carload merchandise, print paper, wood pulp and sugar. The order of the Railroad Administration was issued for the purpose of preventing further congestion of grain at points of origin. It does not prevent the use of box cars for other traffic, but merely stipulates that the needs of grain shippers be given first consideration during the ten-day period.

Taking the stand that the engineer and professional man in general can profit by a knowledge of the law, the Massachusetts Institute of Technology will offer next semester a course in business law to be given by Dean Homer Albers, Boston University Law School. It will be given from the standpoint of technical but not minute legal principles.

Enclosed Starter for Small Motors

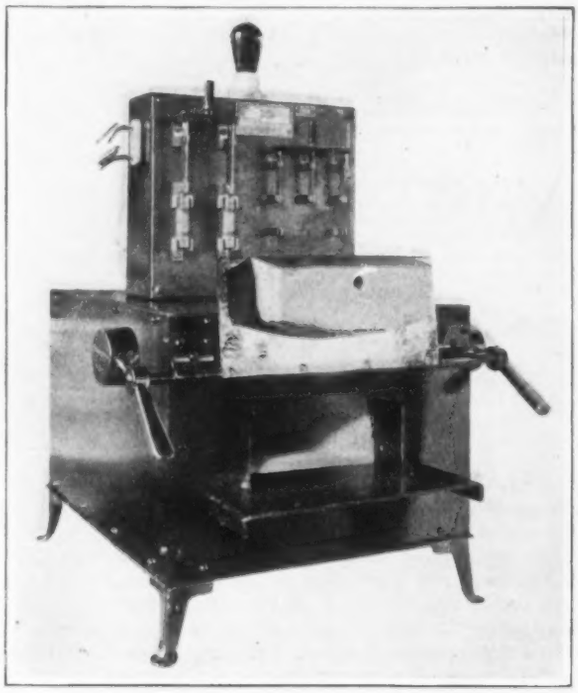
A new enclosed face plate starter for small direct current motors is announced by the Cutler-Hammer Mfg. Co., Milwaukee. The enclosed feature is emphasized as removing danger of exposed parts and as protecting the button and segment contacts from damage due to fine collecting dust or spraying water. This feature makes the starter desirable in exposed locations where the motor drives line shafts, fans, blowers, pumps, drills and small motor-generator sets for arc welding.

It consists of the familiar type of direct current hand starter enclosed in a sheet metal case having an external lever which engages the movable arm of the starter. A pointer on the lever and legends stamped on the cover indicate to the workman whether the starter is off or on. It is made in various capacities up to 50 hp. operating at 115, 230 and 500 volts.

Portable Electric Heat Treating Furnace

An electric furnace of the muffle type, designed for temperatures up to 850 deg. C., for baking vitreous enamel, hardening and tempering tools, dies, etc., has been developed by the General Electric Co., Schenectady, N. Y.

The device consists of the furnace proper with a control panel mounted on top, at the front. The furnace is small enough to be readily placed where convenient. The heating element, which is mounted on the outside of the muffle and covered with compound, is so placed as to give an even distribution of heat throughout the inside. The element is divided so that it is possible to get two degrees of heat, a low and a high heat. The former is used to give a high initial heat, so that the maximum temperature can be reached



A Maximum Temperature of 850 Deg. C. in 1¾ Hr. Is the Rated Capacity of This Muffle Type Electric Heat Treating Furnace

in about 1¾ hr., and the latter is sufficient to maintain this temperature. The muffle is mounted in a steel casing, and the walls, door, etc., are insulated.

The panel which carries the necessary apparatus for controlling the furnace is equipped with a main line switch, a double throw switch for high or low heat, and a red pilot lamp which acts as a warning to the operator when the furnace is on high heat. There are connections at the side of the panel for connecting rheostats when temperatures as low as 300 deg. C. are desired. The furnace is provided with a shelf in front for the convenience of the operator, and the door is equipped with counter weights to keep it open. The high heat requires 4 kw. to bring it up to 850 deg.

FAVORS PROTECTION

Senate Committee Acts on Bills Relating to Tungsten and Magnesite

WASHINGTON, Feb. 23.—Action has been taken by the Senate Finance Committee on two tariff bills affecting the steel industry, one bill relating to tungsten and the other to magnesite. Both bills were passed by the House several months ago.

The magnesite bill was approved by the Senate committee in exactly the form in which it passed the House. The tungsten bill was approved by a subcommittee with an amendment providing a preferential duty on high speed tungsten steel, and similar action is expected by the full committee. The committee took favorable action on the magnesite bill in spite of the protests of Pittsburgh interests which have large investments in magnesite in Austria, and representatives of various consumers, including manufacturers of stucco and other building materials. The bill is designed to establish a tariff wall which will enable the magnesite producers of the states of California and Washington to gain a firm foothold.

The rates of duties which are prescribed in the bill are as follows: magnesite, commercial ore, either crushed or ground, ½c. per lb. Magnesite, calcined, dead burned, and grain, ¾c. per lb. Magnesite brick, ¾c. per lb. and 10 per cent ad valorem.

The change in the tungsten bill was made on the representation of the steel men who declared that there should be a higher duty on steel containing tungsten than on tungsten. The bill provides duties as follows: First.—Crude tungsten ores and concentrates, $10 per unit of tungstic trioxide therein contained, a unit being defined as 1 percentum of a short ton of 2000 lb., namely, 20 lb. of tungstic trioxide.

Second.—High-speed tungsten steel and all alloy steels containing tungsten, $1.50 per lb. of tungsten contained therein. Metallic tungsten, tungsten powder, ferrotungsten (lump and pulverized), ferrotungsten powder, commercial tungstic acid, calcium tungstate, sodium tungstate, and all other salts of tungsten and other manufactured materials containing tungsten (except high-speed tungsten steel, all alloy steels containing tungsten) and all other compounds containing tungsten not specifically provided for in this section, $1 per lb. of tungsten contained therein.

The Senate committee eliminated from the bill as passed by the House the provision that there shall be levied on all tungsten or concentrates which have been imported prior to the passage of the act when such ore has been purchased at a price less than $17 per unit of tungsten trioxide therein contained a tax equal to the difference between the purchase price and that amount.

One of the witnesses before the committee who urged the need of a higher duty on high-speed steel containing tungsten was Carl F. Boker, president Cyclops Steel Co., Titusville, Pa.

"If an additional duty of $1 a pound is placed on ferrotungsten and tungsten metal the price of tungsten will increase correspondingly and be $1 a pound above the price of tungsten in England and other foreign countries," said Mr. Boker. "A higher additional duty should be placed on tungsten contained in steel than on ferrotungsten or tungsten metal because the tungsten contained in steel is a manufactured article. High-speed steel is produced by the following operation: First, the steel containing 18 per cent of tungsten is cast into ingots; second, the ingots are made into billets; third, the finished bars are produced from the billets. During these operations the following losses occur: a loss through scale or oxidation of about 10 per cent or about 10 lb. of every 100 lb. of the weight of ingot. The tungsten contained in the scale is a total loss. A loss through scrap of about 35 per cent or of about 35 lb. of every 100 lb. of the weight of ingots. The tungsten contained in this scrap can be saved by remelting the scrap. The cost sheets at our works, in Titusville, show the cost of the tungsten contained in the finished steel to be 58½ per cent higher than the cost of the tungsten metal used in melting the steel. This increase in the cost of the tungsten represents the cost of the labor, and so forth, spent on the tungsten in producing the steel, the actual loss of tungsten in the scale and the cost of labor, and so forth, spent on the scale and scrap. If an additional duty of $1 per lb. is placed on ferrotungsten and tungsten metal, an additional duty of $1.60 per lb. should be placed in tungsten contained in steel. If this is not done, the American manufacturers of high-speed steel will be in a still more unfavorable position to meet the foreign competition than they are now. Foreign high-speed steel will largely take the place of American high-speed steel in this country. The demand for tungsten in this country will be accordingly reduced, and the object of the bill will not be accomplished. The cost of producing high-speed steel in England under the present existing conditions is about 20 per cent to 30 per cent below the cost of producing high-speed steel in this country."

One of the witnesses before the committe who doubted the advisability of protection of the magnesite industry was B. F. Witbeck of the Ludlum Steel Co.

"I have consulted quite lately with people interested in tungsten mining and my impression is that there is another side to the question—there are grave doubts as to the wisdom of encouraging an increased operation of our tungsten mines," said Mr. Witbeck. "There is not on the surface or blocked out an unlimited amount of tungsten available in the United States, and if you were to do something in the way of a tariff to greatly increase the mining of tungsten, there is a very good chance that you would deplete the resources of tungsten in the United States to the point where there would be practically none available. I do not think that a healthy condition of affairs from the standpoint of war precautions. I have not read in connection with this proceedings or in any other way of anyone who is willing to state that the supply of tungsten in the United States was quite large compared with our needs here. Isn't it a big risk to go and use up all the tungsten in sight and take the chances of being able to develop some more?"

O. F. S.

Erectors Still Fight Union

Five strikes are now in force on building projects in New York, results of the open-shop controversy between the Iron League Erectors' Association, a member of the Building Trades Employers' Association, and the Building Trades Council, composed of unions in the building trades. Although these strikes have been directed against the Iron League Erectors' Association, which refuses to recognize an agreement to the closed shop made by the Board of Governors of the Building Trades Employers' Association, the chief sufferers have been the employers in other trades, whose unions have called sympathetic strikes. They are, however, helpless, as by an agreement with the Building Trades Council they have acquiesced to the right of sympathetic strikes. Added to this, where strikes have been called, the owners have sided with the Iron League and the open-shop principle.

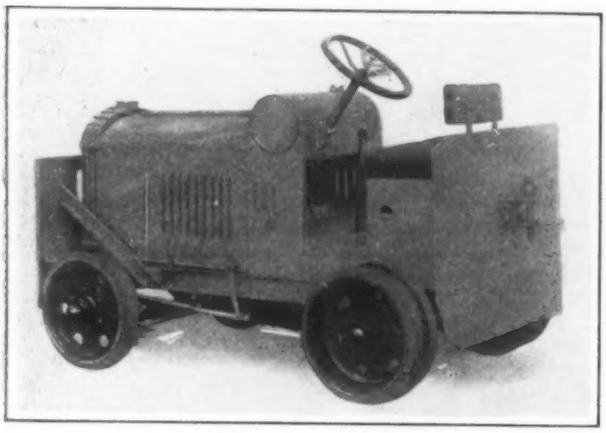
Recognition of the iron workers' union is the only question in the controversy, as the members of the association are now paying non-union workmen from $1.10 to $1.25 an hour with the union scale at $1 an hour. The open-shop advocates point as an example to Chicago, where 100 per cent unionization has been accomplished. Although an agreement for $1 an hour exists until the summer of 1920, a strike is said to be fomenting now for $1.50 an hour.

A number of erectors outside of the Iron League complain that they are unable to obtain fabricated material if they employ union workers. As to this, Walter Drew, counsel for the Iron League Erectors' Association, says: "As to what attitude the companies outside this market are taking, that is their own affair and in most cases I am not informed or advised upon it." Mr. Drew points out that under present conditions, should the fabricators sell to these erectors, they would many times be forced to abandon old customers to sell to erectors hostile to their policy of the open shop.

Gasoline Tractor for Industrial Plants

A gasoline tractor designed for use in industrial plants has recently been brought out by the Towmotor Co., Bliss Road, Euclid postoffice, Cleveland. This is not a remodeled automobile, but a rigidly constructed machine, built for the special requirements for industrial haulage. It is equipped with a 4-cylinder Weidely motor, with a rating of 22.5 hp., but said to have a 40-hp. capacity at 2000 r.p.m.

The motor has removable cylinder heads and overhead valves, large bearing surfaces, forced lubrication to all crankshaft bearings and all moving parts are inclosed. It is claimed to be particularly well suited to heavy duty pulling because of its high torque and flexibility. It has an inclosed centrifugal type governor, adjustable for speeds from 1000 to 2000 r.p.m.



This Four-Cylinder Gasoline Tractor Has a Turning Radius of 10 ft., Permitting Operation Through 7-ft. Aisle Intersections

It is equipped with Delco ignition and starting motor and a Willard storage battery.

The transmission is of the standard selective type, with three speeds forward and one reverse. The rear axle drive is of Torbensen internal gear type with a reduction ratio of 8 to 1. It has a truck type, sliding block, steering column, with spark and throttle control and horn button. Steering is done through the front wheels. There are springs only on the front axle, these being of the semi-elliptic type. The brakes on the rear wheels are of the internal expanding type, controlled either by hand lever or by foot pedal. Gas is fed by gravity from a 9-gal. tank above the cowl. Heavy steel plate bumpers are provided front and rear, the full width of the chassis, to protect the vital part, and there are front and rear couplings of adjustable height. The wheels are of the steel disk type and have 32 x 3½-in. solid rubber tires, single in front and dual in the rear. The tractor will also be furnished with larger wheels.

The tractor weighs 3200 lb. Its wheel base is 60 in., overall length 90 in., tread 44 in., width overall 52 in., and turning radius 10 ft., permitting operation through 7-ft. aisle intersections. Its speed of 1 to 15 miles per hour may be controlled by the governor. It is stated that the motor torque and drive ratios furnish a draw-bar pull approximately three times the tractive ability of the tires over average surfaces, and under average conditions this gives the tractor a capacity of pulling a load of 10 to 15 tons. However, it is stated, a considerable larger percentage of the reserve torque can be utilized in exceptional cases, such as for spotting loaded freight cars.

Test of Lathe Turning Tools

Tests on best speeds, fits and settings of lathe turning tools were discussed in a paper by George W. Burley, presented before a recent meeting of the Institution of Mechanical Engineers, England. The article deals with experiments made with lathe turning tools, and in particular with such matters as relation between the cutting speed and the degree of finish obtained by the use of ordinary lathe finishing and light cutting tools and the influence of the various factors in tool design and position on the cutting power of the tools, power consumption, etc.

A copy of the paper can doubtless be had by addressing Edgar Worthington, secretary of the institution, Storey's Gate, St. James Park, Westminster, S. W. 1, London, England.

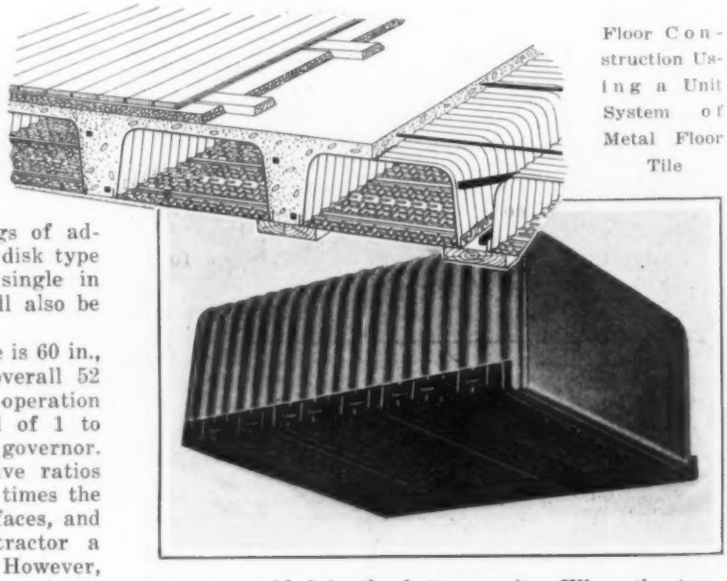
Machine for Sizing Ends of Axle and Pinion Tubes

A machine for sizing the ends of axle and pinion tubes used in automobile construction has been recently developed by the Eastern Production Co., 137 Leib Street, Detroit.

The operation of the machine is by hydraulic pressure developed by a three-cylinder hydraulic pump. The ram is driven with a speed of 1½ in. per second and is returned by hydraulic pressure with the speed of 3 in. per second. The manufacturer states that the time required for the sizing of the two ends of an axle tube within a limit of 0 001 in. in diameter and removing from the machine is 30 seconds. The machine can also be used for reclaiming of tubes which have been turned or ground under size. The drive is from a built-in motor.

Metal Tile System for Floors

A unit system of metal floor tile known as Shurebond is being manufactured by the Goldsmith Metal Lath Co., Cincinnati. It consists of a series of rows of the metal tile units, separated so as to form concrete ribs or joists, which are reinforced and then covered with a thin slab of concrete. These reinforced concrete joists carry the load to the supporting members, the metal tile acting as a filler to form the ribs and support the dead load of the concrete slab as it is being poured. The lath bottom unit is designed to prevent shifting of the rows of tile while concreting, and is explained as making the lath an integral part of the concrete construction. The bottom units are attached to the forms with tacks placed with a magnetic hammer, after which the tile is placed in the



Floor Construction Using a Unit System of Metal Floor Tile

grooves provided in the bottom unit. When the temporary centering is removed, the bottom unit provides a flat and level ceiling to which the plaster is attached.

A metal reinforcement and lath similar in construction to the bottom unit shown is used for plaster partitions, fireproofing for iron beams and columns, cornices, coves, outside walls, and stucco. It is pointed out that the lath is not expanded or stretched in any way, therefore the edges are not exposed to corrosion. This is emphasized as an important factor, especially for inside plastering where gypsum products are used, which are porous and afford no protection to the metal.

COAL PROFITS VANISH

Operators Say Many Mines Are Operating at a Loss—Public Testimony

WASHINGTON, Feb. 24.—The President's coal commission is nearly ready to report.

The coal operators are hopeful that the coal commission will not only refuse to grant the 60 per cent increase in wages, which has all along been demanded by the miners, but will hold that even such an increase as 14 per cent which was granted at the time of the ending of the coal strike was not justified. The brief filed with the commission by the bituminous coal operators declares that the industry as a whole is in a critical condition as a result of the 14 per cent wage advance and that if relief is not given many mines will be compelled to shut down. All the experience of the operators since the 14 per cent increase was put into effect, it is stated in the brief, has disclosed that the universal effect of the wage increase with scarcely an exception has been to wipe out current profits, and that many mines have actually had to run at a loss during the last two months. It is declared that only the pressing necessity to turn out the coal needed by the country and the expectation that justice would ultimately be done, have induced the operators to keep the mines going in spite of losses. Figures compiled by the coal operators tend to show that prior to the wage advance their margins of profit did not exceed 4 per cent and that the application of the 14 per cent wage increase has reduced this 4 per cent margin to 1 per cent in some instances and more than wiped it out in many others.

Operators' Profits

The coal commission has appointed a sub-committee of five which will receive detailed data from the operators on the effect of the 14 per cent advance, and go generally into the matter of operators' profits. This committee is composed of John P. Cameron, chairman of the Pittsburgh Mine Operators, who was regional administrator for Pennsylvania under the Fuel Administration during the war; C. E. Lesher of Washington, statistical expert of the Geological Survey; Percy Tetlow of Salem, Ohio, statistical expert of the United Mine Workers; D. M. Reynolds, of the Council of National Defense; and Paul White of Cleveland, son of John P. White, representative of the miners on the coal commission.

To statements that members of the commission had failed to clear up the uncertainty as to what may be expected with respect to coal and coke prices, Chairman Robinson of the commission has stated that the commission has no authority to fix prices and that it does not expect to ask for authority until it has unanimously agreed on its final award. He stated further that it was entirely uncertain as to whether it would be concluded that there is need for price fixing. In the meantime, the prices for coal and coke which were reimposed by the Fuel Administration at the time of the coal strike will remain in effect. It is expected that the commission's report will be made about March 1.

Senate Wants to Know

The dissatisfaction with the present situation in which there is no one in authority to interpret orders of the Fuel Administration or give relief in cases where prices may be unwarranted is steadily growing. This sentiment was reflected in the Senate by the adoption of a resolution by Senator Frelinghuysen of New Jersey requesting the Director General of Railroads to report to the Senate the extent of the authority, powers and duties with respect to the shipment, distribution, apportionment or storage of coal or coke, originally delegated to the Fuel Administrator and subsequently transferred to the Director General of Railroads by executive order. The resolution also requests information as to whether the authority, power or duty of the Railroad Administration in this respect has been extended, enlarged or curtailed by the President, and the contents of all papers, documents or memoranda delegating or conferring the authority.

The American Wholesale Coal Association is preparing to file a petition in court, asking an injunction against interference by the Central Coal Committee of the Railroad Administration in the distribution of coal and asking also an estimate by the commission to determine the payments to be made to owners of shipments that were diverted during the strike in November. It is contended by the coal men that there is no occasion for the continuation of the Railroad Administration's control over the distribution of coal.

Price Advances in Belgium

WASHINGTON, Feb. 24.—Conditions causing the advancing prices of iron and steel in Belgium are reported by Vice-Consul Harry Tuck Sherman from Antwerp, as follows:

"Prices in the iron and steel market are going up owing to the growing demand and the inability of manufacturers to increase their production because of lack of raw material," says Mr. Sherman. "The shortage of coke and ore is for the greater part responsible for this state of affairs. The railroad upon which depends the transportation of ore and pig iron from the Grand Duchy of Luxemburg has ceased to operate for want of fuel. This in itself is a very serious handicap to the manufacturer.

"It is hoped that the coke situation will be relieved by the arrival of coke from Germany. Eighty thousand tons per month are required from that country, which is only one-half the amount imported before the war. Belgium imported roughly 2,000,000 tons of coke annually before the war, the greater part of which came from Germany, which country sent to Belgium 5,200,000 tons of coal in 1913. Besides coke, Germany sent to Belgium a great quantity of gas coal for lighting purposes, for the glass blowers, and for the Martin furnaces of the steel works. The introduction of coal for coke making is one of the factors in the resumption of economic relations between Belgium and Germany."

Method of Making Cement-Coated Nails

In THE IRON AGE of Jan. 29 appeared an article on cement-coated nails, giving the history of their manufacture, uses and advantages. More data on the method of manufacture is given in a communication from D. S. Muckley, superintendent rod and wire works, Cambria Steel Co., Johnstown, Pa. He says in this regard:

"I might advise that the ingredients of the coating for cement-coated nails is made principally of resin. This is usually mixed with about 30 per cent of either yellow shellac or gum copal. The entire mixture is ground in an iron tumbling barrel until well mixed and thoroughly pulverized, and is then thrown into a cast-iron tumblig barrel with the nails, the barrel being revolved over a fire to melt the coating and distribute it evenly over the product. The ordinary tumbling barrel used for this purpose holds about 300 lb. and the amount of coating is 4 to 5 lb. to the net ton.

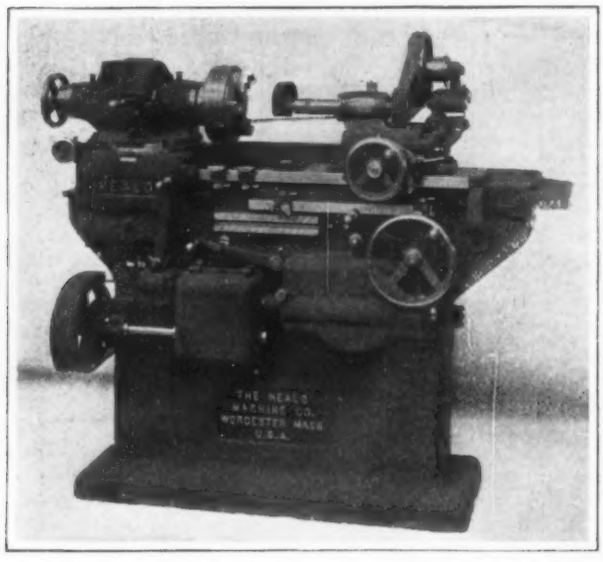
"Some manufacturers use a dipping coat for this purpose, the gums being dissolved in light solvent and the nails dipped in baskets. As a very large proportion of them are machine-driven it is necessary to exercise great care in manufacturing them, as the nails must be straight, with heads and points well centered."

Advice to United States manufacturers who are planning to be represented at the Buenos Aires Exposition in November is given by S. J. Stoughton, director Rothacker Film Mfg. Co., Chicago. He says that the display of the goods themselves will be supplemented by moving pictures of the plants where made, the processes of manufacture, the living conditions of the workmen—all of which impresses the South American with the stability of American industries, and induces him to buy. It is estimated that 2,000,000 will attend this exposition. Another exposition will be held in Rio de Janeiro in the spring of 1921.

Improved Internal Grinding Machine

Several important changes recently have been incorporated on style No. 70 internal grinding machine made by the Heald Machine Co., Worcester, Mass., the most important of which is the redesigning of the work head. Formerly the friction clutch that started and stopped the work was located in the jack shaft. Now it is part of the work head with the work drive pulley revolving on the spindle instead of being keyed to it.

In the old construction, the installation of the jack shaft was more or less of a task to the millwrights, as



The Friction Clutch for Starting and Stopping the Work Is Made a Part of the Work Head in This Improved Heald Internal Grinding Machine

it was important that its location be very accurate, otherwise successful operation of the clutch was impossible. It also was awkward to make adjustments of the clutch when located on the ceiling. With the new construction, not only are these difficulties taken care of, but the convenience to the operator of being able to start and stop his work so readily should result in increased production.

Another change in the tool is the lengthening of the base ways on the right-hand end 4 in., which allows greater distance in the running back of the wheel and is advantageous when grinding long holes and it is necessary to test with a plug.

The wheel guard has been altered in shape and size so that it entirely covers the grinder, and the hand wheel for operating the table has been increased in diameter to give greater leverage. The pump, which has been successful on the company's rotary machines, has been adopted as regular equipment on the No. 70.

Induction Furnaces for Making Steel

Many electric steel furnaces of the induction type are described in detail by Jean Escard in the *Revue générale de l'Electricité*, Dec. 13, 1919. In abstracting this, *Technical Review*, London, says that the article is a very attractive one from the technical point of view, the principle being that the metal to be treated forms the secondary of a transformer and heats by the action of the current induced in it. The weak point is the low power factor, and various methods are employed in modern furnaces to improve it, such as a combination of the induction and resistance systems. A low frequency must be used, in some cases no more than five periods per second.

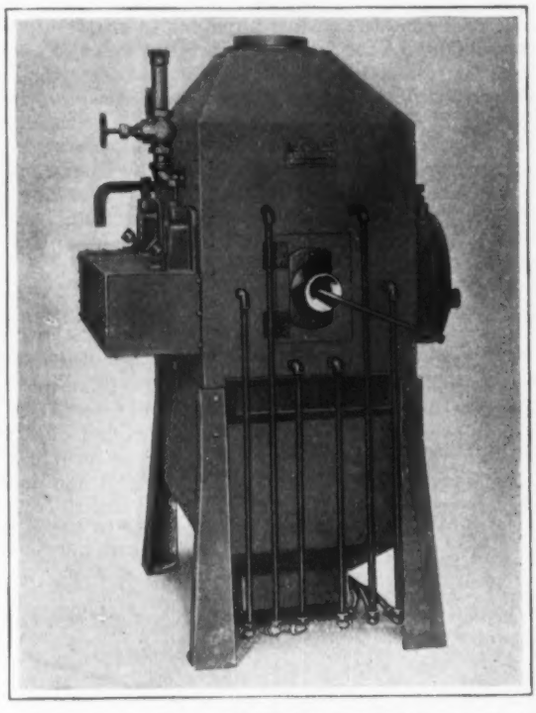
The first induction furnace was designed by Ferranti in 1885, but was not successfully developed commercially. This is described and illustrated, also the Kjellin-Gysinge furnace, put in service in 1900; Montuncon furnace, used in conjunction with an open-hearth furnace, which first melts and partly refines the metal; and various types of Hiorth furnace, largely used in Norway and Germany. The earliest induction furnaces were naturally designed for single-phase current; this is still used for the smaller sizes, but large capacity furnaces are now invariably of the three-phase type. Such are the Röchling-Rodenhauser, Frick, Saladin-Schneider, Gin and Grönwall-Lindblad furnaces, of which plans and photographs are given. The Röchling-Rodenhauser is a combined induction and resistance furnace, the resistance plate currents being also inductively obtained from a second primary winding. The Frick furnace resembles it in many details—this type was used by the Krupp works. In the Saladin-Schneider furnace the main mass of molten metal is in a separate chamber from the smaller one, which is directly heated and which communicates with the larger by circulating tubes, and the circulation principle is also employed in the Gin furnace. In the Grönwall-Lindblad furnace the core surrounds the metal chamber as well as the primary coils, which can thus be safely brought considerably nearer to the molten metal. Other types have been designed by the same makers to improve the power factor.

Full particulars of the mechanical details and methods of operation, also analyses of the products obtained, are given for the various furnaces described.

Rod Cleaning Sand-blast Cabinet

A new cabinet for the sand-blasting of various shaped rods from ⅜ in. to ⅞ in. in diameter is announced by the Pangborn Corporation, Hagerstown, Maryland. The blasting operation is entirely confined thus to remove the operator from all contact with the dust-laden air, and to permit installation of the cabinet with other machine tools without detriment.

A set of rolls and guides at either end of the cabinet



Continuous Operation and Hygienic Construction Are Features Emphasized for This Sand-Blast Cabinet Designed for Cleaning Various Shaped Rods from ⅜ in. to ⅞ in. in Diameter

provide constant, uniform travel of the rods through the blasting zone. Six blast projectors, centering to the rod at a 45 degree angle, cover the entire surface of the rod with the blast stream, the discharge being directed into a small chamber that utilizes the rebound effectiveness of the abrasive. The manufacturer states that scale has been removed from a rod ¾ in. in diameter with 80 lb. air pressure at 50 lineal ft. per min.

The bottom of the cabinet forms a hopper for abrasive storage. The blast action is of the suction type and individual feed boxes in the sight of the operator feed each blast projector. Connection to an exhaust system removes disintegrated material. The cabinet is for use with sand or metal abrasives.

LARGE ORE BUSINESS

Extensive Preparations for the Season by Lake Superior Companies

DULUTH, MINN., Feb. 23.—Mining companies are preparing for far larger business in 1920 than last year, and the mine schedules, when they come out, will show this.

It is understood that the Hull-Rust pit, including the mine of that name, and Sellers and Burt, as well, is intending to put out no less than 11,000,000 tons, which is to be compared with about 6,000,000 tons from the same pit in 1919. Mahoning is a part of this same pit, and with that mine included the production of that one Mesaba opening for the year is now estimated at about 13,500,000 tons of ore. It is generally believed that the Mesaba range will make a product during the year of not less than 48,000,000 tons. The Oliver Mining Co. is sinking several shafts, and is otherwise arranging for a larger product than ever; independents are doing the same, and the amount of new material, machinery, etc., that is being contracted for is astonishing. The one difficulty is to get the supplies and the delivery.

New Kind of Shovel

Something entirely new is the big revolving electric shovel; one of these has been contracted for by the Hanna Ore Co. for use at its new Wabigon property. This will be a 300-ton shovel, with an 80-ft. boom and an 8-yd. dipper for stripping with a 6-yd. dipper for ore mining. A feature of this shovel, which differentiates it from the large electric shovels used in coal mining, is that its power application is that of field control, rather than rheostatic. The objectionable heavy peak loads are eliminated by the method of application, and there is believed to be a great saving. This shovel will be operated by one man, assisted by one oiler. Its operation will be watched here and elsewhere with the deepest interest. The many and new problems in connection with this shovel have been worked out by engineers of the General Electric Co. and by R. S. Walker, chief engineer for the Hanna company. Wabigon is a deposit of more than 10,000,000 tons, owned to the extent of 90 per cent by the Great Northern Iron Ore Properties, and is under lease on royalties varying from 65c. to $1.15. It is under a heavy thickness of overburden.

The Tod-Stambaugh company is redrilling the lands lying just west of the Mississippi River at the extreme western portion of the known Mesaba formation, which were once drilled and experimented with by the Jones & Laughlin Steel Co. The ore is low grade and washable, and exists in considerable quantity. This drilling will be more in the nature of check work than of extending the deposit, and is not expected to take very long.

Will Erect Concentrator

Announcement has now been made by the Breitung interests, of Negaunee, as to the concentrator proposed to be erected by them on the Cuyuna, at the village of Trommald, which was first referred to in the annual review of the Lake Superior region published in THE IRON AGE, Jan. 1. It is to have capacity for about 3000 tons per day. Ore will be mined in a deep pit by steam shovels, transported by mine cars to a raise, dumped into a pocket at the foot of this raise and hoisted to the mill in 5-ton skips operated electrically. It will be the first mine to hoist washing ore through a shaft. The mine is to be stripped hydraulically, and the machinery for this work has been secured from the nearby Hillcrest mine of Coates & Tweed. There is some 90 ft. of stripping over the ore at this property, but the grade of the washed ore is expected to be excellent.

At Shenango mine of the Shenango Furnace Co., arrangements are proceeding rapidly to change the open pit property into a milling and underground operation. The 100-ton steam shovels are to be replaced by 45-ton shovels, which will load ore into 3-ton hopper bottom mine cars; these will be pushed to the foot of an incline cableway, up which they will be hauled by a stationary hoist to the foot of the shaft, the loads dumped into skips and lifted in these to surface. It is no novel application, but is the first adaptation in the district. The vertical lift in the shaft is about 300 ft. The reason for this change in manner of operation is because of the depth of the mine, which made further open pit mining unsafe.

Bessemer Ore at Zenith Mine

Very high-grade Bessemer ore is being found in new parts of Zenith mine, Vermillion range, formerly an Oliver Mining Co. property, but now mined by an independent syndicate under a sliding scale lease. This lease will call for a royalty this year of about $1.50 per ton, against the old 30c. royalty paid under the Carnegie Steel Co. agreement, turned over to the Oliver company at the time of the organization of the Steel Corporation. Efforts are being made to reorganize the Section Thirty Mining Co., a well-known Vermillion range property; if they are successful, a deep shaft will be sunk on the south side the formation and the deep-seated ores, known to exist, will be won. Unless a new shaft can be financed it is probable that the property will become idle, as mining from the present openings is inadvisable. The mine is the only developed part of the Section Thirty basin, which many competent engineers consider to have as great possibilities as did the Ely basin, wherein are the two Chandlers, Pioneer, Zenith and Sibley. Just to the east of the Section Thirty mine the Chippewa Iron Co. is developing by shaft sinking and drilling, and has spent some $250,000 in the past two years, but so far without the results that such an expenditure should be expected to secure. A four-compartment exploratory shaft is to be sunk on the LaRue property, Armstrong bay, Vermillion range. This property was explored by Mr. LaRue, optioned to Coates & Tweed, who sank the small shaft to 120 ft., but did not maintain the operation further. The property is looked upon with favor as a Vermillion range prospect, and Mr. LaRue's work showed high-grade ore in some quantity. The fee ownership is, in part, by the Steel Corporation, through the Oliver company. The Phoenix Iron Co., which took over the Vermillion Extension property, northeast of Vermillion lake, is developing its mine for shipments this year, and expects to make a considerable product of high-grade ore.

Sizable Shipments to St. Louis Anticipated

In addition to the probability of record shipments to furnaces situated on the Atlantic seaboard, there will be this year shipments of some magnitude to St. Louis by mines of the Steel & Tube Co. of America and by Cuyuna range producers. The former will go by lake to Chicago and then by rail, the latter by rail to St. Paul, and then by river, providing the cost of this latter method is not found prohibitive.

Barton R. Shover, consulting electrical and steam engineer of Pittsburgh, addressed the regular monthly meeting of the Engineers' Club of the Youngstown district, Feb. 24, on "Making Steel in India." He erected one of the first plants in India. Mr. Shover designed the original plant of the Brier Hill Steel Co. and is designing and will superintend erection of the plant of the Electric Alloy Steel Co., Youngstown.

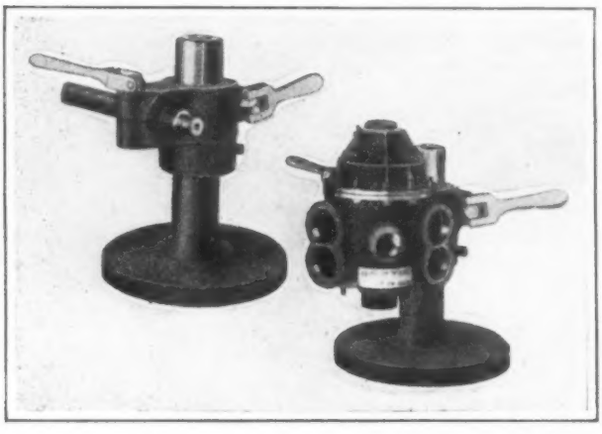
Slocum, Avram & Slocum Laboratories, Inc., Newark, N. J., has undergone a complete change in management and has been provided with additional capital. The company recently took over the manufacture of all Flexite products, heretofore produced by F. R. Blair & Co., Inc., including universal joints, propeller shafts and flexible magneto couplings. The executive offices are in the Woolworth Building, New York.

F. S. Lust and F. C. Zehrman announce that they have incorporated their business under the name of Lust & Co., Inc., to deal in a general line of iron and steel products at 220 Broadway, New York.

Vise for Pneumatic Drills

A vise designed to clamp and hold pneumatic drills in various accessible positions while the necessary repairs, assembling and testing are done has been placed on the market by the Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago.

The vise is made of a flanged upright machine post or stand, which is equipped with a sliding stop collar for quickly adjusting the vise to proper height for convenient working. This collar is held by a set-screw. Located directly above the collar is a clamp which swivels on the collar and is securely held in any position by tightening a quick action clamp screw. At the other end of the clamp is a hole in which the suitable



Pneumatic Drills Are Held in Various Accessible Positions by This Vise for Repairs, Assembling and Testing

size of stem is engaged. These stems are threaded at one end with ½-in. and ¾-in. pipe threads, respectively. The stem is inserted in the vise clamp, which is then tightened by a clamp screw. The drill is then screwed on the stem at the dead handle hole and is ready to be repaired. For small size drills a stem with ⅛-in. pipe threads is used in connection with a special stem support.

Employment in the Steel Industry

WASHINGTON, Feb. 24.—The iron and steel industry leads all others in employment increase for January, 1920, as compared with December, 1919, according to the figures which have been compiled by the Bureau of Labor Statistics. These are the regular monthly statistics of 13 selected industries. According to this data the half-monthly payroll in 99 iron and steel establishments showed 177,674 employees in January, 1920, an increase of 12.4 per cent over December of 158,067. The payroll increase was even larger, totaling $12,615,643 in January, against $11,099,157 in December, an increase of 13.7 per cent. The nearest approach to this increase was in the automobile industry, in which the number of employees increased 5 per cent and the payroll 12.4 per cent. As compared with January, 1919, 97 iron and steel establishments showed a decrease of 8.7 per cent in the number of employees. The January, 1920, payroll numbered 174,797 employees against 191,486 in January, 1919. The payroll of these establishments was $12,378,710 in January, 1920, a decrease of 6.6 per cent from the January, 1919, figures of $13,250,085. By surveying 13 industries the comparative data showed that in 9 industries there was an increase in the number of persons on the payroll in January as compared with December, and in four a decrease. The largest increase in the number of people employed appears in iron and steel, 12.4 per cent. Decreases of 3.4 and 2.6 per cent are shown in cigar manufacturing and car building and repairing respectively. In comparing January, 1920 with December, 1919, nine industries show an increase in the amount of money paid to employees and four a decrease.

The figures for January, 1919, and January, 1920, show that in 10 industries there was an increase this year against January of last year in the number of persons employed, while in three there was a decrease. Eleven of the 13 industries showed an increase in the total amount of the payroll for January, 1920, as compared with January, 1919, and two showed a decrease.

New Method of Testing the Fragility of Metal Tubes

A new method for testing the fragility of metal tubes is described by Ch. Frémont in *Comptes Rendus*, Nov. 3, 1919. It is abstracted by *Technical Review*, London, as follows:

The new method consists in taking a detached ferrule of the particular tube to be tested, and notching it perpendicular to the fibre, this tube-end being then submitted to dynamic flexure. This bending test must be carried out either lengthwise or crosswise. In the former case the notch is made perpendicular to the axis of the tube, and in the latter case, parallel to it. The more the tube has to resist in use, the narrower the test nick.

For the lengthwise test the piece of tube (ferrule) must have a length equal to about two-and-a-half times its external diameter. It is notched by making a saw-cut in it to a definite depth. The tube-ferrule is mounted on two mandrils, having the same shape and outer diameter as the internal diameter of the tube, and both terminating in a plane supporting surface, so as to keep the ferrule rigid and localize the deformation due to bending.

The bending test is carried out by means of a falling tap or a spring hammer having a velocity of impact of 8 to 10 meters per second. The writer carried out the crosswise test by opening out the tube, under impact, until it fractured.

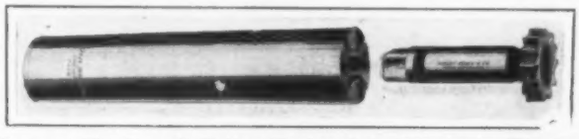
The ferrule is first expanded 3 or 4 mm. by static or dynamic pressure effected on a cone of a given angle. Two saw-nicks are then made diametrically opposite each other, and equal in depth to this preliminary widening. Final rupture is effected by shock, the speed of impact being 8 to 10 mm. per sec. The shock is applied to the cone, which is replaced in the ferrule as before.

In the majority of cases fracture takes place through one of the two saw-cuts; the other cut widens out, and gives, by comparison with its initial width, a measure of the local ductility on the notched test-piece tested for impact.

The measurement in question is sufficient for ordinary acceptance tests, and for tubes up to 50 or 60 mm. diameter. As regards the testing of tubes 40 mm. diameter and above, the method described by the writer in a previous paper (*Comptes Rendus*, Aug. 4, 1919) is applicable

Woodruff Keyway Chuck and Cutter

A Woodruff keyway chuck, also a Woodruff keyway cutter having a squared shank, and to be used in conjunction with the chuck, are being manufactured by



Keyway Chuck and Cutter Designed to Eliminate Slipping of the Cutter and to Prevent the Destruction of the Shanks and Jaws of the Chuck

Scully-Jones & Co., Railway Exchange Building, Chicago. The chuck has the action of a draw-in collet, and is explained as insuring a true-running cutter and a positive drive, thus to eliminate the slipping of the cutter and to prevent the destruction of the shanks and jaws of the chucks. The chuck is made in one piece and in all tapers to fit various makes of milling machines.

The trustees of the Southern Railroad have formed a plan to submit to a vote of the people of Cincinnati a proposal for the issuing of bonds to the amount of $20,000,000 to build railroad terminals in that city. The necessary legislation authorizing the issue was passed by the Ohio General Assembly in 1917. The vote will be taken shortly after the railroads are handed back to private ownership, and if favorably received by the electors, the matter will be taken up at that time with the different railroads now coming into the city.

Mining and Metallurgical Engineers

February Session Discusses the One-Piece Gun, Blast-Furnace Flue Dust and Changes in Steel at Super-Normal Temperatures

WHILE the papers on iron and steel presented at the 121st general meeting of the American Institute of Mining and Metallurgical Engineers regularly held in New York in the third week in February were not so numerous nor of such general interest to the steel industry as in previous years, there were several of prime importance. The program of nine papers elicited an attendance of a fair proportion of steel metallurgists and the papers were quite liberally discussed. The morning session on Wednesday, Feb. 18, was devoted to those of more general commercial interest, while those in the afternoon were confined largely to alloy steel.

The One-Piece Gun

One of the most interesting papers at the first session was entitled, "An Experiment in One-Piece Gun Construction," presented by the author, P. W. Bridgman, professor of physics, Jefferson Physical Laboratory, Harvard University, Cambridge, Mass. A brief abstract of this paper, which will receive more extended consideration in a later issue of THE IRON AGE, is as follows:

During the war the Navy undertook to build an experimental gun embodying features aimed to lessen the cost and time of production. The first drawings were made in June, 1917, and the experiment was completed in November, 1918. It is well known that if a hollow cylinder is subjected to internal fluid pressure the maximum stress occurs in the inside layers, the outer parts carrying much less than their due share of the stress. This stress inequality is more pronounced, the thicker the walls of the cylinder. If such a cylinder is forced to the elastic limit, failure in elasticity will take place long before the outer layers have reached the limit of their capacity. Economical use of material would demand, however, that all parts of the cylinder reach the limits of their capacity at the same time. This may be brought about, at least in cylinders that are not too thick, by producing in the inner layers an initial compression and in the outer layers an initial tension. The effect of iternal pressure is at first to relieve the compression of the inside layers while increasing the tension of the outside. If the initial stresses are properly distributed all parts of the cylinder will reach their elastic limits at the same time, thus giving a cylinder of maximum strength for its weight. In gun construction, as heretofore practiced, this initial distribution of stresses is produced either by winding the inner tube with wire, a British practice, or by shrinking hoops over the inner tube, which has been the standard American practice. Both of these processes are long and expensive.

There is another possible method of producing the desired internal compression, said Mr. Bridgman. If a heavy cylinder is stretched considerably beyond its elastic limit the inner layers flow and the outer layers receive a permanent stretch. On release of the pressure the outer layers shrink back on the inner, producing an internal compression, and of course an equilibrating tension in the outside layers. If the pressure is again re-applied it is found that the elastic limit has been raised to the previous maximum pressure. In this way it is possible to raie the limit to two or three times the value as calculated by usual theory. This behavior of cylinders under high internal pressure was demonstrated experimentally and has been continually used in the construction of apparatus for high pressure experiments at the Jefferson Physical Laboratory since 1906. Hydrostatic pressures as high as 300,000 lb. per sq. in. have been accurately measured. With regard to gun fabrication it has been demonstrated by actual construction and firing tests that it is possible to make guns from a single forging producing the required distribution of internal stresses by a preliminary application of hydrostatic pressure so high as to strain the material considerably beyond its yield point. The great simplicity of construction by this method leads to the expectation of important economies of time and money if quantity production should be attempted.

The paper describes the technique of controlling the required pressures, which are in the neighborhood of 100,000 lb. per sq. in., and also describes the behavior of the hollow cylinders composing the gun when stretched by heavy internal pressure.

Prof. Joseph W. Richards, Lehigh University, who occupied the chair, in opening the discussion called attention to the great possibilities in store for the application of the principles brought out by Mr. Bridgman, and called upon Dr. F. Giolitti, chief engineer Ansaldo & Co., Turin, Italy, who is at present American representative of that company in charge of its interests in the United States, and who formerly was chairman of the board of the company and located in Italy. Dr. Giolitti recounted briefly the experience of the Italian government in making guns of one piece, using a principle practically the same as that outlined by the author. He also stated that the same principle had been used in France during the war, and that in Italy they had succeeded in making guns as large as 10 in. by this process. Dr. Giolitti illustrated a modification of the method of applying the pressure, in which a small tube was used inside of the main cylinder of the gun, as a means of applying the pressure, which he considered considerably more simple under certain conditions.

Blast-Furnace Flue Dust

Another paper of the morning session was entitled "Blast-Furnace Flue Dust," by R. W. H. Atcherson, blast-furnace superintendent Inland Steel Co., Indiana Harbor, Ind. The principal points made by Mr. Atcherson in his paper are as follows:

Blast-furnace flue dust is one of the most troublesome operating factors in the iron and steel industry. Several successful operators claim that it is useless to recharge raw flue dust because the furnace would never have blown it out if it had been suitable material for blast-furnace consumption. Yet some very remarkable results have been attained at the Ohio Works of the Carnegie Steel Co. through recharging raw dust.

Much of the opposition to the use of fine ores in blast furnaces is superficial and prejudicial. Burdens composed entirely of fine ores are being very successfully handled by furnaces built on lines as developed today. High flue dust production, where prevalent with high percentages of fine ores in the burden, is frequently due to an improper mixing or sizing of the ores. The obvious requirement of finer and denser layers is an augmented gas pressure, sufficient to force through the denser layer. This action is rather more violent than would be the normal flow of gas and is attended by a greater disturbance of the stock, resulting in a larger production of dust than would follow the passage of the gas through the more open layers of ore. As a means of limiting the segregation of the fines into layers in the furnace, the method of charging is of incalculable value as a corrective feature but is not sufficiently thorough to counteract indifferent handling at the mines and docks. The intimate mixture of each ore into a uniform material physically also brings about a much desired chemical equality.

From any view point, coke is the very life blood on which the whole smelting process depends. The physical structure of the coke has a very much greater influence on every phase of blast-furance practice than has the structure of any of the other materials. As indicating the effect of soft coke on flue-dust production, a comparative statement is given,

covering two operating periods on the same furnace under apparently identical conditions aside from the coking time on the byproduct ovens.

This paper was discussed by C. A. Meissner, United States Steel Corporation, 71 Broadway, New York, who said in part as follows:

This problem is a very vexing one. If we do not eliminate it from our gas it makes dirty stoves, dirty boilers and inefficient combustion, with frequent interruptions through cleaning of stoves, etc. If we do take it out it is very apt to be a nuisance when it comes to handling it. If we take it out with the wet process we have a sludge which, while it can be thickened by settling or in Dorr thickeners, or similar apparatus, yet it comes to us in a mass with at least 50 per cent of water, and the problem arises how to get it out of the water after we get it in. If we take it out dry, and there are yet, I might add, only three dry processes that can be considered, then we all know that hot dry flue dust is not always an easy or a safe proposition to handle, although we have all learned to handle it with but occasional accidents, but when these accidents do occur men are liable to be horribly burned.

The easiest form for re-using the flue dust is to put it back as raw dust, and, as Mr. Atcherson shows, this has been done on a very large scale, but only with a certain amount of success. My own experience in watching results of blast furnaces using raw dust has been that after a while they slow down their production. You may hold the coke consumption about where it had been, and you may show a lessening of costs, which is natural if you do not charge yourself again with the value of the flue dust, with the exception of handling costs, taking the ground that it has already been paid for as ore and coke, but the furnace will not, as a rule, give the same production of pig iron.

Furthermore, the condition of the furnace, and above all the lines of the furnace are potent factors in the ability to re-use raw dust without disturbing influences on the furnace. When a furnace is running well and freely and perhaps carries a certain amount of scrap, I have known in certain plants that two furnaces which were in the condition above described took all the flue dust they made and some more, while the two other furnaces of the plant, which were not in as good a condition of operation or lines, would immediately show trouble if any large percentage of raw dust was used on them. Then again take the furnaces with more modern lines, with large hearths and steep angles and low boshes, they can carry practically all the flue dust made, because in the first instance the tendency is to make less dust by more smooth operation due to the better lines, and second, they will absorb more deleterious materials, such as raw dust, more freely. There is one thing certain: When a furnace refuses to operate properly when all its dust is being returned to it, you will sooner or later run into serious trouble if you try to force this furnace to take all its dust.

As to the causes of dust, Mr. Atcherson has gone very fully into this and the fact that the dust from Mesaba ore furnaces show 45 to 50 per cent of iron plainly indicates that it comes from the ore as well as from the coke.

The condition of the furnace, its smoothness of operation, or its tendency to hang and slip are all factors in the production of fine dust. Whether the scheme outlined by Mr. Atcherson of dust catchers will materially lessen the formation of the flue dust is a matter that has to be tried out.

As to the effect of the turbo-blowers against reciprocating engines, we will have to wait a little longer before that can be definitely determined. I think that a furnace with good modern lines and a careful method of mixing and charging the raw material, thus giving good operating conditions will always give the least amount of dust.

As to the final disposition of the dust, I cannot help but feel that a good sintered dust is more satisfactory than raw dust, because it always seems somewhat absurd to me that we have to take great precaution to screen the dust out of our coke and then turn around and put coke dust from the flue dust into the furnace; even though it may be said that in the one case the dust from coke may be supplied irregularly, while the dust from the flues is put in in regular proportions. I think anything in the shape of fine coke dust has a tendency to be amalgamated or partially fused with the slag and makes what we all know to be a very infusible material of carbon and slag, not permitting the air to obtain access to the carbon in such a way as to produce combustion.

High Temperatures and Boiler Plate Strength

An interesting paper in an entirely different line was "Tensile Properties of Boiler Plate at Elevated Temperatures," by H. J. French, chief heat treatment section, division of metallurgy, United States Bureau of Standards, Washington. The paper was presented by the author and is a report of supplementary tests made on two grades of ½-in. plate, and includes a description of the apparatus used in the determination of the proportional limit. The steels tested were ½-in. boiler plate of fire box and marine grades.

An ingenious method of applying the heat to the specimen in the testing machine is described. The test specimen was heated by means of an electric tube furnace, two spiral resistors in series being used. The furnace was operated on either 110 or 220 volts, direct current, close regulation being obtained by two 15-ohm, 30-amp. variable resistances in series in the circuit. In both grades of plates it was demonstrated that an increase in temperature from 70 to 870 deg. Fahr. is accompanied by distinct changes in strength and ductility; that is, the tensile strength at first decreases a few thousand pounds per square inch, reaching a minimum at about 200 deg. Fahr., followd by an increase up to 550 deg. Fahr. where the tensile strength reaches a maximum about 10 per cent greater than the normal room temperature, after which another and final decrease occurs. The percentage of elongation in 2 in. decreases rather slowly up to about 200 deg. Fahr., after which it drops more rapidly until a minimum is reached at about 470 deg. Fahr. The reduction in area closely follows the inflections registered in the curve for elongation, but has a minimum at slightly higher temperatures than the elongation.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., in discussing the paper, stated that the author's work bears out results published by Mr. Howard as far back as 1888. In this investigation steels averaging from 0.10 to 1 per cent carbon seemed to follow the same rule.

Semi-Steel

At the same session three papers were presented having to do with the general subject of cast iron. One was by Frank E. Hall, director of laboratories, American Radiator Co., Buffalo, N. Y., entitled "Manufacture of Semi-Steel for Shells." This paper, which was presented by title, discusses the chemical requirements of semi-steel, the specifications of the United States Ordnance Department, and cupola practice in producing this material. The other two papers were on "Graphitization of White Cast Iron," by R. S. Archer, metallographist, Aluminum Manufactures, Inc., Cleveland, and "Application of the Microscope to the Malleable Iron Industry," by Enrique Touceda, Albany, N. Y.

The paper by Mr. Hall on semi-steel was discussed by R. F. Harrington, Hunt-Spiller Mfg. Corporation, Boston, who brought up the question of the relative wearing properties of semi-steel as compared with cast iron, the point which he made being that in his opinion properly made air furnace iron has just as good, if not better, wearing qualities, than semi-steel. He stated that some manufacturers of locomotive frictional parts used the air furnace to reduce the carbon content of their product while others resorted to additions of scrap steel to the cupola. He stated that it was the opinion of practical men that the wearing qualities with steel were not as good as in the case where steel was not used in the manufacture of the iron.

Changes in Steel at High Temperatures

The paper which attracted the most attention at the session Wednesday afternoon was entitled, "Physical Changes in Iron and Steel Below the Thermal Critical Range," by Dr. Zay Jeffries, director of research, Aluminum Castings Co., Cleveland. An abstract of this important paper is found elsewhere in this issue. Dr. Jeffries presented a clear statement of the principal points covered and emphasized the practical bearing of the results. He called attention to the fact that the only results which he offered as conclusive were those on the changes in tensile strength below the thermal critical temperature and only suggested a solution of the other phenomena which he cited. Whether these unusual changes are due to some allotropic form of iron or steel not yet thoroughly understood he was not in a position to declare, but stated that further study along these lines was well

worth while, and might explain the interesting and unusual phenomena.

Forgeability of Iron-Nickel Alloys

Another paper at this session was "Forgeability of Iron-Nickel Alloys," by T. D. Yensen, research engineer, Westinghouse research laboratory, Pittsburgh. These alloys, said Mr. Yensen, which are of certain commercial importance, have presented considerable difficulty because of the fact that the pure alloys do not readily forge. In the investigation of the magnetic properties of these alloys it has been found necessary in order to make them forgeable or malleable to add small quantities of some other elements. Mr. Yensen reported that the additions of small amounts of manganese have made the alloys forgeable and as the paper shows to what extent manganese is needed for various nickel contents and also what the effect is of other elements on the forgeability. The conclusions of the author were as follows:

Pure iron-nickel alloys do not forge readily, if at all, at ordinary forging temperatures.

Aluminum, carbon, magnesium, or silicon have little or no effect upon the forgeability.

Manganese or titanium in amounts of 2 per cent, of the lesser constituent make the alloys forgeable.

Whereas the degree of forgeability of a material depends on the relative strength of the crystalline and the intercrystalline—or amorphous—material, the forgeability of an ingot or casting can be ascertained only by actually attempting to deform the material, either by forging or rolling, or by a tensile test. Metallography has not yet reached a stage where an inspection of the microstructure will give any definite information in this respect.

The fact that manganese and titanium tranform iron-nickel alloys from non-forgeable to forgeable alloys means that these elements have the ability to strengthen the amorphous material that is generated between the crystals to such an extent as to make it stronger than the crystalline material.

Dr. Colin G. Finck, Chile Exploration Co., New York, in opening the discussion on this paper, said that in his experience iron-nickel alloys containing from 20 to 60 per cent nickel were non-forgeable, and that while all of them contain some manganese it was a question whether the presence of carbon did not cause considerable trouble, and his object in calling attention to this was to bring out some facts as to the effect of carbon.

Dr. Jeffries termed the paper a very timely one, and was of the opinion that it should help to solve not only the problem of iron-nickel alloys but also some general forging problems. He said that the question of the strength of the inter-crystalline cement was an important one, and that the primary conditions of forgeability include not only that the crystals themselves must be forgeable, but that the cement must also be of sufficient strength.

"The Microstructure of Iron and Mild Steel at High Temperatures," by H. S. Rawdon and Howard Scott, was presented in abstract by the latter. In a brief discussion of this paper the question was brought up as to whether it was possible to expel and get rid of certain impurities and crystallized formations by the so-called elbowing movement of crystals among themselves.

This point was answered by Dr. Jeffries to the effect that such changes were impossible with metal in the solid state.

Sales of Steel Rail Explained

The War Department authorizes publication of the following statement from the Office of the Director of Sales:

The Director of Sales announces that the 57,000 tons of 80-lb. A. R. A. type B rail, sold by the Corps of Engineers to the J. K. Joice Co. the latter part of September of last year, had previously been offered to the railroads of this country through the Railroad Administration and rejected by them as being a type of rail wholly unsuited for use on the railroads of America.

The standard type of rail section, as adopted by the railroads of the United States, is known as the American Society of Civil Engineers, or A. S. C. E. section, and is so designed that the base is equal in width to the height of the rail. The ball of this rail is always designed to be a certain proportion of the height.

The A. R. A. type B rail is a composite blend of the American Railway Association's design and is entirely different in section from the standard A. S. C. E. rail. Never having been adopted by the railroads of this country, the A. R. A. type B rail is unsuited for use upon America's standard railroads. Being of a special section, it obviously requires special accessories in the way of splice bars, etc.

At the time the sale was made to the J. K. Joice Co. it was considered a most advantageous one for the Government in that the accepted bid of $40 per ton was $4 per ton higher than any bid previously obtained. At that time the sale was considered an excellent one by the highest authorities in the iron and steel business.

Continuous Rails by Autogenous Welding

The continuous rail is becoming one of the problems of railroad work, says Prof. C. F. Keel, director Swiss Acetylene Society, in an article in the *Revue de la Soudure Autogène.* The present practice of bolting rails together causes discomfort to passengers and fatigue in the metal. Efforts have been made to realize the ideal of a continuous rail by means of electric, oxyacetylene and thermit welding. The author gives the results of tests made in welded joints and describes a new method of making such joints. This is as follows, as abstracted by the *Technical Review*, London:

The head and foot are both welded; but the web is cut out by means of a torch, because it was found that when the welding extended through the web, it was difficult to preserve the alignment of the rails. In the case of rails already laid, the author recommends that the base, which is subjected to the greatest strains, be welded first. He proposes to continue the use of the ordinary fish-plates to aid in maintaining the alignment. As welding rod he uses a metal as nearly like that of the rail as possible. These rods contain some silicon and some manganese. A flux having a base of sodium carbonate has been used.

Trumbull Steel Co.'s Additions

Structural steel is now being erected at the plant of the Trumbull Steel Co., Warren, Ohio, near the tin mill department, to house the 9-in. and 12-in. Morgan continuous hot-rolled strip steel mills which are to be installed, equipment being furnished by the Morgan Construction Co., Worcester, Mass. The larger-sized mill will be of the continuous type with the roll stands arranged tandem, while the housings of the 9-in. mill will be built on the same axis. During the rolling process the strips will be looped from one set of rolls to the other. Capacity of the cold-rolled strip steel department is being doubled. The initial installation comprises 8, 12 and 16-in. continuous units of four stands each. With completion of its new installations the Trumbull company will have an annual capacity of strip steel of 150,000 tons.

Articles of incorporation have been filed for the Butler Art Institute which is to take over and maintain for "edification and enjoyment" of people of the Mahoning valley the art gallery erected by Joseph G. Butler, Jr., vice-president of the Brier Hill Steel Co. and director of the American Iron and Steel Institute. The gift also includes Mr. Butler's collection of 75 paintings by leading American artists. He has increased the original endowment of $100,000 to $200,000.

The Plant Engineering & Equipment Co., Inc., New York, manufacturer of valve steam traps, condensation meter and other power and heating specialties, announces the opening of its twenty-sixth office to care for the increasing demands for its products. M. William Ehrlich, experienced in consulting and contracting engineering, will be the New Jersey manager in charge, with headquarters at Newark, N. J., and a sub-office at Lyndhurst, N. J.

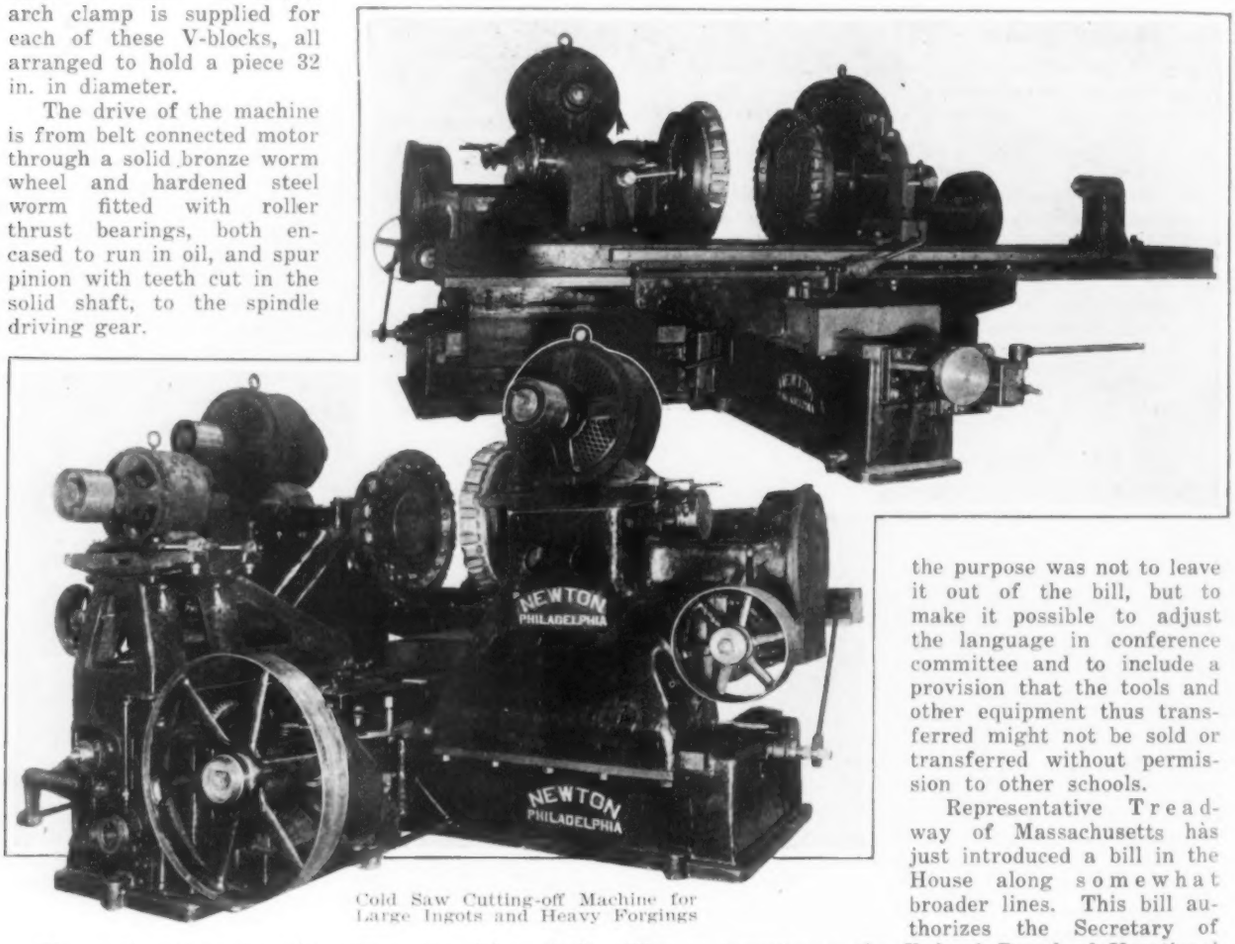
Cold Saw for Cutting 24-In. Stock

A recent development in cold saw cutting-off machines for cutting large ingots and heavy forgings has been made by the Newton Machine Tool Works, Inc., Philadelphia. This saw is equipped with an inserted tooth saw blade, 76 in. in diameter, which has a capacity for cutting 24-in. diameter stock in one cut.

A main work table is bolted to the machine base and is 56 in. long in the direction of the feed of the saw and 48 in. wide. To this table there is bolted a platen 60 in. long and 56 in. wide and 12 in. deep, with suitable tee slots. On this platen there is a clamping block which is 18 in. wide at the base and 12 in. wide at the top. This block is in line with the top of the main table.

Two V-blocks are fitted to the main work table and one V-block is fitted to the platen, making a total of three V-blocks. A swivel arch clamp is supplied for each of these V-blocks, all arranged to hold a piece 32 in. in diameter.

The drive of the machine is from belt connected motor through a solid bronze worm wheel and hardened steel worm fitted with roller thrust bearings, both encased to run in oil, and spur pinion with teeth cut in the solid shaft, to the spindle driving gear.



Cold Saw Cutting-off Machine for Large Ingots and Heavy Forgings

The feed motion is taken from the drive shaft through gears to the oil-tight feed box, in which the change gears are mounted on sliding sleeve controlled by latch levers in the cover. From this box the motion is transmitted to the saddle feed screw through a feed worm and worm wheel which is positively clutched. The control of the machine is from the rear and forward feed is provided with automatic stop and rapid traverse forward and back with automatic stop. Feed and rapid traverse mechanism is enclosed with curtain covers. Positive safety release is provided for each extreme position of traverse.

The oil and chip pan is cast on the base to drain the lubricant back to the reservoir. A loose chip pan is fitted between the tables for draining to this oil pan.

Officers of the Powell Pressed Steel Co., recently formed at Youngstown, Ohio, with a capital of $225,000 to manufacture pressed and stamped steel articles, are seeking a site in Trumbull county. Purchases of machinery were made some time ago. W. J. Powell, one of the incorporators, has been active with the Youngstown Pressed Steel Co., now building a plant in Warren, Ohio, to replace its properties at Haselton, Ohio, and Sharon, Pa.

Transfer of Machine Tools

WASHINGTON, Feb. 24.—An item relating to the transfer of surplus machine tools to the Federal Board of Vocational Education is in the annual deficiency appropriation bill pending in Congress. The House inserted in the bill on the floor a paragraph authorizing the Secretary of War to transfer to the board without compensation certain machine tools and other equipment belonging to the War Department now in possession of the board and being used by the board as equipment for schools for vocational education. It was provided that this property, which amounts to $250,000 worth, should be dropped from the records of the War Department on the filing with the department of the board's receipt for them.

The Senate Committee on Appropriations has eliminated this item. In so doing it has stated that the purpose was not to leave it out of the bill, but to make it possible to adjust the language in conference committee and to include a provision that the tools and other equipment thus transferred might not be sold or transferred without permission to other schools.

Representative Treadway of Massachusetts has just introduced a bill in the House along somewhat broader lines. This bill authorizes the Secretary of War to transfer to the Federal Board of Vocational Education additional surplus machine tools and other equipment. It is stipulated in the bill that all charges for transfer and loading the materials shall be paid by the board.

The Senate some time ago passed a bill somewhat similar to the item which has been incorporated in the deficiency appropriation bill. The action taken in connection with the appropriation bill is a substitute for the original Senate measure.

A heavy demand continues for ferromanganese, the recent movement in prices not having any particular influence on the market, says the London *Iron and Coal Trades Review* in a late issue. The home trade is firmly maintained at £28 10s., while, as already noted, there is a substantial export demand, the minimum price for which is £30 f.o.b. For near delivery, however, as much as £35 has been readily paid, and the limit does not yet appear to have been reached.

The Firth-Sterling Steel Co., 35 Oliver Street, Boston, is now located in new offices and warehouse at 85-87-89-91 West First Street, South Boston.

Industrial Relations

Safety and Good Will

Short Talks on Vital Questions by One of Experience

This is the fifth of a series of articles on Industrial Relations by Thomas Stanion, director of safety, Aluminum Manufacturers, Inc., Cleveland, formerly the Aluminum Castings Co. It shows how association in safety work causes a more cordial feeling between employer and employees.

"I tell you accidents can't be stopped in this foundry. I've been superintendent of this place for 20 years; we always have had accidents and always will." A picture taken recently by a prominent safety-first secretary in a Western logging mill showing 42 men, every one of whom had one hand maimed through an industrial accident, would seem to be good testimony to prove the emphatic assertion of our superintendent that accidents cannot be avoided. No answer will be made other than to point to the actual records of accomplishment made by hundreds of companies and corporations covering every field and hazard. Accidents have been greatly reduced, with a consequent saving of life, limb and money, and the workers themselves receiving the greatest relative benefit. The men in the shops have sensed this fact, and energetically supported the safety work, once they were convinced of management's good faith. On this question of industrial accident prevention, admittedly non-controversial, men and management have something in common, which has come to be surrounded by a feeling of good-will. This proves that workmen, by and large, are interested in other phases of their work besides frequent increases in wages with shorter hours and less production.

Recently a dozen prominent executives of a certain city had gathered at their club for lunch for a discussion of a proposed community safety-first program. Various lines of industry were represented—mines, steel mills, machine shops, retail stores, automobile makers, textiles, etc. After much explanation and discussion, one of the men said: "Gentlemen, this safety work is the *only* activity on which we can approach our men and expect their whole-hearted support, regardless of any previous relations. It is our one common meeting ground; non-controversial and perfectly apparent that the men will gain most through its efforts. It is basic and fundamental to all work intended for employees' betterment." Quite so. The fundamental is the thing we want first. True, it may not be safety work in every case, but if the employees are to be interested in the improvement of working conditions, and from that step efforts are to be made to arouse their co-operation, they will call it a sham, if, after a company inaugurates a policy of better things for the workers, glaring accident hazards are allowed to remain. These men recognize accident hazards, and will expect to see the employer's good intentions expressed in terms of removing such conditions.

Granting that such a feeling of mutual confidence exists on this one point in a shop or plant, it is not a difficult step to enter into a broader program, for safety work brings benefits to all, and hence for its real success must have the active co-operation of all concerned. The part the employee is to play cannot be carried through by the employer, nor vice versa. It is in the exercise of his proper part that each receives the benefits. Once the thought and action of the two parties is centered on a common project of mutual benefit and each recognizes the good intentions of the other, this interest can, with careful handling, be carried over to some other problem which is as much of mutual interest as safety work, but not heretofore so recognized. The employer has invested his capital, the employee has invested his time, and unless the business succeeds the investments of both will suffer. If the two can pull together a little more evenly and strongly, the investments of both should prosper.

It is largely a task of education that is involved—to teach the employees something of the problems of management, and to bring to the employer more of the problems of his men—problems that seem mighty real to the workers. Knowledge of the one about the other helps each to recognize that they have common problems and to more intelligently tackle their solution. Safety work makes for industrial good-will and assists splendidly in giving the worker a new conception of the losses accidents cause, not only compensation and hospital costs, but reduced production, spoiled work and such items. It affords a chance for proper discussion of things vital to men and company, and gives a program which, once established, can be enlarged to cover other employee problems, of themselves appearing to be mighty big, but if handled from this fundamental, gradually lose their formidable shape just as the bridge which looms so big in the distance becomes quite simple when actually crossed.

A Belgian maker of boiler tubes is making some effort to sell the product to United States consumers. He has offered 50 mm. (2 in.) tubes of 2½ mm. (0.1 in.) thickness of wall in lengths of 4.6 m. (15 ft.) at 9.50 fr. per m. (21c. per ft.) with exchange at 13.75 fr. per dollar. Tubes of 133 mm. diameter (5¼ in.), 4 mm. wall thickness (0.157 in.) and 4.6 m. lengths are offered at 45 fr. per m. ($1 per ft.). These prices on Jan. 1 were 9 fr. and 30 fr. respectively, and the prices are for the material on docks at Antwerp or other Belgian ports. Deliveries cannot be made before April 1.

Canadian rights to the Lloyd-Oxyaceteline method of making steel tubing, an invention of Marshall Burns Lloyd of Menominee, Mich., have been sold to the Standard Parts Co., Cleveland, which is operating a factory in Woodstock, Ontario. This is the second Lloyd patent right to be sold in Canada during the last three months. A short time ago his wicker weaving method and loom privileges for the northern country were disposed of.

The Portland cement industry is showing speedy recovery from the war setback of 1918. Preliminary estimates compiled by the Geological Survey indicate that the production and shipments of Portland cement in 1919 increased 13 and 21 per cent respectively over those in 1918 and that the stocks decreased 52 per cent, so that at the end of 1919 less than 5,000,000 bbl. of Portland cement were in stock at the mills.

The plant of C. H. Grimm & Co., Rutland, Vt., maple sugar implements, was destroyed by fire Feb. 14, with a loss of $50,000.

Deep Cutting of Appropriations Proposed

Bureau of Standards and Bureau of Foreign and Domestic Commerce Will Suffer Severely if Plans of House Leaders Are Carried Out—Secretary Alexander Protests

WASHINGTON, Feb. 24.—Retrenchment policies of the Republican House leaders have hit departments of the Government which maintain a contact with the business and industrial interests of the country. Two bureaus most severely affected are the Bureau of Standards and the Bureau of Foreign and Domestic Commerce, both under the Department of Commerce. A clamor of protest is already being heard from commercial organizations and individual business men throughout the country, and it is possible that the action thus far taken may be reversed before the appropriation bill is finally passed.

The reductions were made in the annual legislative, executive and judiciary bill by the House Committee on Appropriations. The bill is now before the House.

Both the Bureau of Standards and the Bureau of Foreign and Domestic Commerce had asked for considerably more than they were granted last year. The committee, however, cut large sums off last year's figures. The Bureau of Standards was allotted only $1,217,360 as against $1,852,260 for the current fiscal year, a reduction of $634,900.

The Bureau of Foreign and Domestic Commerce, which during the current year has had $910,510, was cut to $487,470, a reduction of $423,040.

Service in War Time

The Bureau of Standards was an important branch in the Governmental service during the war, conducting scientific investigations of very great value in connection with war industries. The program of the officials of the bureau has been to develop increasing usefulness to peace-time industries, but the cuts in appropriations, if allowed to stand, threaten to interfere seriously with the plans which have been made. The House committee arbitrarily ordered the elimination of 40 employees of the bureau, a saving on this item of $56,200. Included in the list of those who must be dispensed with if the bill is passed are five physicists, three chemists and other employees. The bureau had asked for an appropriation to cover salaries alone amounting to $671,440, as against salaries during the current year of $486,760. The amount allowed by the committee is $432,360, or $239,080 less than the amount requested.

One of the items included in the estimates and submitted by the bureau was $250,000 for industrial research; the committee allowed $50,000. The bureau asked for $250,000 for investigation of structural materials; the committee allowed $125,000. The bureau asked for $150,000 for machinery, apparatus and supplies; the committee allowed $75,000. The bureau asked $55,000 for the operation and maintenance of testing machines; the committee allowed $30,000. The bureau asked for $200,000 for public utility service; the committee allowed $85,000. The bureau asked for $50,000 for the equipment of a laboratory for motor combustion standards; the committee struck out the appropriation entirely. The bureau asked for $150,000 for work in connection with internal combustion engines; the committee struck out the item entirely. The bureau asked for $15,000 for standard materials; the item was struck out. The bureau asked for $35,000 for the regulation of weights and measures; the item was struck out entirely. The bureau asked for $40,000 for the standardization of mechanical appliances; the sum of $15,000 was allowed. The bureau asked for $60,000 for standard gages, etc., but got only $40.000. The bureau asked for $75,000 for metallurgical research, but got only $25,000. The bureau asked for $50,000 for work on industrial safety standardization, but the item was struck out entirely. The bureau asked for $75,000 for work of standardization of instruments, machinery and equipment, but the item was struck out.

Eliminating Attaches

One of the chief cuts made in the Bureau of Foreign and Domestic Commerce was the elimination of commercial attaches, for which $165,000 was appropriated last year, and for which $300,000 had been asked for next year. The bureau had requested $500,000 for the promotion and development of foreign and domestic commerce, but was allowed only $175,000 as against $325,000 appropriated for the current year. The bureau asked for $150,000 for promoting commerce with the Far East, but was given only $50,000. The sum appropriated for the present year was $100,000. The bureau asked for $150,000 for promoting commerce with Central and South America, but was allowed only $100,000. The committee ordered 38 employees of the bureau in Washington, including six chiefs of divisions, dropped from the payroll.

Representative Wood of Indiana is the chairman of the subcommittee of the House appropriations committee which made the reductions. In explaining the cuts in the appropriation for the Bureau of Standards, Mr. Wood said that if the United States kept up with the demands of the bureau in its enthusiasm for development, it would bankrupt the Government. In referring to the elimination of commercial attaches, Mr. Wood attributed the action to the lack of cooperation, as he viewed it, between the State Department and the Department of Commerce in their work abroad.

Secretary of Commerce Alexander, in commenting on the reductions of estimates for the promotion of foreign trade, declared that this was "the most serious blow ever aimed from within at our foreign trade." He added:

Secretary Alexander's Statement

"At the very time when the European and Japanese governments are striving strenuously to perfect their trade-promoting machinery through enormously increased appropriations, this bill proposes to scrap the American machine, the most effective and smoothest running that any Government has ever been able to assemble. At the very time when other governments are busily engaged in copying this machine almost to the last detail, this bill proposes to smash it to smithereens. At the very time when our rivals have an almost overwhelming trade advantage in exchange rates, this bill proposes to handicap the American manufacturer by practically withdrawing the helping hand of the Government. Almost on the day when our merchant marine becomes a fact it is virtually announced that foreign trade is not worth supporting. Just as our banks, wisely legislated for, find themselves in a position to finance our trade as efficiently as other countries finance it, it is discovered that foreign-trade promotion is a waste of money. On the brink of uncertainty as to the future of our foreign trade, and

therefore of our whole industrial fabric, it is decided in the name of economy that we are not interested in the subject.

"The bill aims to abolish the commercial attaches entirely. This service was established in 1914 at the request of American business. It has won the approval and respect of American business. As now conducted, it costs $165,000, a trifling and inadequate sum. There is not an office in the service that does not turn in more than that every year in actual business, and the contracts obtained by American business houses through some of the offices run into the millions of dollars. That is taking into account only the promotion work that can be figured in dollars and cents. Twelve commercial attaches—men trained and experienced in commercial and economic matters—who are at present attached to embassies and legations in a dozen foreign capitals, where they are charged specifically and solely with the promotion of American business interests at this critical period, will be withdrawn peremptorily within three months' time and dismissed.

Reducing the Force

"Not all of our trade commissioners are to be dismissed, but their number is to be greatly reduced. At least 15 trade commissioners who are reporting on rapidly changing commercial conditions in European countries from Denmark to Austria will have to be recalled by the first of May. The cut in the fund from which the European commissioners are paid means that this department, through the Bureau of Foreign and Domestic Commerce, can pay no attention to the critical reconstruction developments in that part of the world. Please keep in mind the fact that these are not reductions from what we ask next year, but from what we have had to keep the machinery running during a period when foreign trade was marking time. For promoting trade in the Far East, the cut amounts to 50 per cent. That means a great slackening of effort in a district where Japan, Germany and England are doubling their efforts. The great markets of the East will return a thousandfold every dollar this Government spends there."

Secretary Alexander said that if the appropriation stands as at present it will be necessary to close up all the district and co-operative offices in the United States which are promoting commerce in conjunction with the Chambers of Commerce in the various cities.

O. F. S.

Shells Stand Test

WASHINGTON, Feb. 24.—The first lot of experimental 16-in. armor piercing shells made at the Naval Armor and Projectile Plant at Charleston, W. Va., has passed successfully all Navy requirements. This is considered by Navy officials a remarkable achievement because of the great difficulty experienced in the manufacture of shells of this caliber. These are the shells with which the Colorado and other battleships of late types and all battle cruisers are equipped. The weight of one of the 16-in. shells is 2400 lb.

P. C. Kuegle, manager of the Buckeye Land Co., subsidiary of the Youngstown Sheet & Tube Co. in charge of its housing projects, is spending some time in the South buying materials for future construction. He will speak at the national conference on Concrete Construction in Chicago, on the subject "Practicability of Concrete in House Construction."

F. Sherman, principal owner of the Youngstown Iron & Metal Co., and L. Schuler, formerly with Joseph Joseph & Bros. Co. at Youngstown, Ohio, have incorporated the Youngstown Scrap Iron & Metal Co. with $200,000 capital, to conduct a scrap metal plant on Poland Avenue, Youngstown.

LACK OF FREIGHT CARS

Machine Tool Business Handicapped—New Designs to be Announced Later

From a transportation standpoint the machine tool business in Worcester, Mass., is unsatisfactory. Having recovered from foundry labor troubles, the tool makers are confronted with a lack of freight cars. Railroad freight traffic has been paralyzed by succeeding snows, sleet storms, ice and enforced embargoes, making cars inaccessible. Many machine tool builders have made no shipments by rail since Jan. 25, or thereabout.

From a new business standpoint the builders have no fault to find. The amount of business on books is exceptionally large, and it is difficult to locate a company that can guarantee delivery on any one special type of tool inside three months. Bookings cover a wide range of tools, with grinding machines and planers perhaps sharing the honors of first place in demands. In numerous instances firms are booked ahead six months and longer.

Some plants are operating day and night in an effort to turn orders into cash. Since freight cars have been inaccessible, finished machine tools are boxed and crated for delivery as soon as the railroad embargo is lifted. The accumulation of ready-to-ship tools in some cases is very large. Many boxed tools bear foreign addresses, mostly English, this being especially noticeable in the case of grinding machines.

One phase of the railroad transportation problem—that of fuel—grows more serious daily. Machine tool plants operated by electric power furnished by local generators have no uneasiness, for power and lighting companies in Worcester and elsewhere are better provided with coal than other industries are. Reserve fuel supplies of machine tool plants operating under their own power have been materially cut into during the past fortnight or so, some of them to nearly the point of exhaustion. An exasperating feature is that hundreds of filled coal cars are frozen and snowed in between railroad junction points just outside Massachusetts, and Boston, the carriers apparently being powerless to move them. Judging from the snow on top of the coal in some cars sidetracked they have been there 15 days or longer.

Under existing transportation and booked-up conditions it is not surprising that machine builders are not placing new design tools on the market. Naturally their main effort is directed to filling the many orders on books. The little new work during the past few months has been mainly along improvement on old machine lines.

Almost without exception, however, machine builders report new tools, some of them radical in design, in progress. This new equipment should make its appearance on the market next spring and summer. The designs, in certain instances, will be based on ideas suggested during the war period, when American-made machine tools proved their worth.

Diesel engine castings was the subject of a paper presented by F. J. Cook, past-president British Foundrymen's Association, at the January meeting of the North-East Coast Institution of Engineers and Shipbuilders, Bolbec Hall, New Castle-Upon-Tyne, England. The paper discusses such subjects as crystallization, chemical composition, surface wear, annealing, impact test, casting temperature, etc. A copy of the paper can doubtless be had by addressing E. W. Fraser Smith, secretary of the institution.

Training for Foreign Trade, a booklet for the use of those conducting classes in foreign trade in educational institutions and business houses, has been issued as miscellaneous series bulletin, No. 97, by the Bureau of Foreign and Domestic Commerce, Washington. It will also serve as a guide to business men in their private reading and research. Copies may be obtained from the Superintendent of Documents, Washington.

ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published Every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

W. H. Taylor, *President and Treasurer* Fritz J. Frank, *Vice-President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Chas. G. Phillips, *Vice-Pres.* W. H. Taylor, *Treas.* A. C. Pearson, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Tremont Building. Philadelphia: Real Estate Trust Building. Cleveland: Guardian Building. Cincinnati: Mercantile Library Building. Washington: 613 Fifteenth Street, N. W. San Francisco: 320 Market Street.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $5.00; Canada, $7.50; Foreign, $10.00 per year. Single copy, 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879

The Clouding Industrial Sky

Some concern has lately been expressed in iron and steel circles with regard to the period of present high demand. It arises largely among those who have commonly felt that the securities market is a forecaster of things in the industrial field. The violent changes which have occurred in international exchange and the resultant curtailment of general exporting to Europe are feared because of the sentimental reaction likely to be felt in domestic buying. This is partly because exporting as a big factor with the United States has been exaggerated. It is not merely that iron and steel exporting itself is relatively a small item in comparison with production for domestic consumption, but that a reduction in the volume of exports of goods in other lines may spell a check to business activity. Underlying is the expansion in credits, which has long been disregarded, at least outside of banking, and is slow in being adjusted. The movement downward in security prices, if it reflects pessimism in financial circles, is bound to have some effect on business, but a part of this movement may be the actual readjustment demanded by the investor who looks for a return which will approximate the buying power of dividends before the inflation.

As has happened before, the portentous clouds on the horizon seem to appear when industrially we can see no reason for alarm. Few specific events have occurred which could be mentioned as forerunners of any business setback. Indeed it is possible that these are seized on now as indicators, when a few months ago they would have been regarded as the exceptions which prove the rule. We need to keep our ear to the ground, but at the same time must not allow ourselves to get in that frame of mind that every rumbling is a sign of a storm.

The reassuring things are that production has gone quickly into consumption; that there are little or no reserve stocks; that it would take a heavy avalanche of cancellations to bring about the effect of even temporary over-production, and with the easily proved large volume of unsatisfied demand, most anyone would be inclined to admit that any business check would be either of short duration or certainly not very violent. If such a view is maintained in the event of negative developments, the psychological result would probably be a temporary setback at the most, and it goes without saying that most anybody would welcome a shaking up which would tend to get the country back into a real peace-time attitude toward work and business.

In short, the opportunity to rest a while and get a better perspective on things in general is likely to have a highly salutary result, and does not necessarily mean that we need to expect as yet the liquidation which must undoubtedly some day come about to compensate for the years of energy lost in the waste of war.

Ruthless Treatment of Two Bureaus

In another column the Washington correspondent of THE IRON AGE presents the details of the "mathematical economy" by which the appropriations committee of the House of Representatives has undertaken to cripple the research work of the Bureau of Standards and the promotion of foreign commerce by the Bureau of Foreign and Domestic Commerce. Both bureaus are vital portions of the machinery of the Department of Commerce. Both have contributed on an important scale to the progress of our domestic industries and our foreign trade. The committee does not even claim to have exercised ordinary judgment in reducing their appropriations for the coming fiscal year. It cut off a round $1,100,000 solely on the percentage basis, striving to equal the 28 per cent decrease from estimates decreed by the political party leaders of the House. So good and bad had to go overboard alike. One of the committee apologists who framed the report explained that Europe could not pay her bills in this country anyhow; so why bother with trying to expand our commerce abroad? His geography made no distinction between Europe and the world.

But the whole irrational scheme of mathematical economy is false. Reductions in Government

expenses are imperative, but it is a sad confession of bankrupt statesmanship to seek that economy by hacking off the top 28 per cent of every appropriation estimate—good, bad and indifferent. Such a course can only cripple the whole Governmental machine. Applied to the Bureau of Standards and the Bureau of Foreign and Domestic Commerce, it reminds us of the farmer who tried to economize by planting a few bushels of wheat less per acre. Making one blade of grass grow where two grew before may be good politics, but it is mighty poor sense. A little more brains and a little less politics would do a lot of good in legislative undertakings.

The Senate must pass upon the House bill before it can become a law, and there is still time for American industry to assert itself there, but it will take prompt action to arouse Senatorial interest in the sabotage planned by the House leaders against these Government bureaus.

Both of these bureaus are rendering highly efficient service to the manufacturing and exporting interests of the country. More and more have manufacturers come to depend upon the Bureau of Standards, which is not in any sense a partisan body. Likewise the foreign bureau has distinguished itself in a high degree, as it has been separated from partisanship. Now is the time for the business men of the country to protest and protest vigorously against the proposed crippling of these two important bureaus.

Financing Essential Industries

That the credit situation is being strained at the present time is becoming more clearly evident. Leading bankers and other business men are giving serious attention to the problem of bringing about better conditions. James S. Alexander, president of the National Bank of Commerce, New York, in a statement which has just been made public, takes the stand that public interest imperatively requires the conservation of credit so that the needs of essential enterprises rather than non-essential activities will be provided for. He says that the soundness of the business situation requires that the ratio of the gold base to the credit structure be such that all practical needs will be easily met, maintaining unwavering public faith. He says that while in June, 1913, the per cent of gold to other money and checkable desposits was 18, it was only 11.4 on Sept. 1, 1919. Mr. Alexander says to remedy the situation fundamentally it would seem necessary to begin at the starting point of the trouble and stimulate the production of necessities, but since there is not enough credit now available to finance the production of necessities in the required volumes and at the same time finance extensive speculative movements and non-essential activities without further inflating credit, the duty rests upon the banks and business men to make such conservative use of the credit resources of the country as these conditions obviously dictate.

"I believe," adds Mr. Alexander, "that it is the public, as well as the private, duty of banks to draw the line most carefully between loans for essential enterprises and those for non-essential employment, and to favor the former class in the interest of maintaining the strength of the general business situation."

Mr. Alexander also points out that in case commercial depression should come, if it found the business structure of the country chiefly engaged in necessary enterprises, less serious results would follow than if it found the business organization largely engaged in activities which would be more vulnerable to public retrenchment.

Under the conditions laid down by Mr. Alexander, the iron and steel industries of the country would have little to fear. While they would not rank as essential to the same degree as they did during the war, there could be no question about their being generally essential and entitled to preferential treatment in financial matters. The railroads, too, would be in the essential class and the necessity of spending vast amounts of money in improving equipment and other properties as soon as possible with reasonable financial assistance is beyond dispute. While there is no cause for alarm at the present time, Mr. Alexander has rendered a distinct service in calling attention to the situation so that business men and others may realize its seriousness.

Temperatures in Working Steel

It is not commonly known, except among metallurgists, and some of these are apparently not as alive to the facts as they should be, that unusual and in most cases permanent changes take place in iron and steel when worked at temperatures below the lower thermal critical range. The clear presentation of the subject at the meeting of the American Institute of Mining and Metallurgical Engineers last week in New York by Dr. Zay Jeffries is therefore particularly important.

One of the most striking points emphasized is the change in tensile properties of iron and steel with a rise in temperature. Ingot iron and certain steels, some of them alloy, when rolled or worked at temperatures ranging variously up to 500 to 550 deg. C., have their tensile strength increased from a small percentage up to 90 or 100 per cent. The results appear specially remarkable in the cases of ingot iron and nickel-chrome steel. Dr. Jeffries' splendid summary also covers the effect of aging or time on the strength of certain heat-treated medium carbon steels. Some steels are stronger by 100 per cent after resting a given time after heat treatment than indicated by tests made immediately after treatment and machining. There is also the phenomenon of surface deformation after quenching from a blue heat and the effect of certain temperatures on the thermal and electrical resistivity of steels as well as the rather striking fact of the spontaneous generation of heat, as well as contraction, of recently hardened steels. There is even brought out also the fact that some nickel-chrome steels offer more resistance to impact when quenched from the tempering heat than when cooled slowly from that temperature.

While these interesting facts have their technical and theoretical side, they have also a decided practical bearing. The explanation of these phe-

nomena is a matter for the physicist and metallurgist and the solution of them seems to be not far off. In industry a realization of the bearing of these changes is important. It is readily apparent that from the evidence presented rolling or forging steel or iron without too closely regarding temperatures may harm the product. Hot straightening of warped forgings, if done at a blue heat, may be detrimental, and the facts should be known. Wire may be rendered brittle or made stronger depending on the range of temperature within which the original metal is deformed. Useful variations in properties produced by deformation in the blue-heat range may also be possible.

Dr. Jeffries' summary brings to the front not only the advances that are being made so rapidly in the study of the constitution of iron and steel in all its phases but the importance of a proper regulation of the temperatures at which steel is worked. As to the latter there have been rapid strides in the use of pyrometers in heating furnaces and in the regulation of all rolling and working temperatures. But from the evidence referred to there is still the belief that there is not only room for much improvement in the application of the proper temperature for working iron and steel but that the possible benefits yet to be realized are many.

SHIPMENTS DELAYED

Shortage of Cars in Youngstown District Seriously Interferes with Movement of Products

YOUNGSTOWN, OHIO, Feb. 24.—Demoralization of transportation is still preventing iron and steel companies in the Youngstown, Ohio, district from materially improving production. Threatened shutdowns, however, which have become imminent at frequent intervals, have fortunately been avoided to a large extent by the timely arrival of belated fuel shipments. Heads of mill transportation departments have gone personally to the railroad yards in an endeavor to expedite movement of raw materials.

Not only have coal, coke and limestone been held up, but finished product has piled in mill yards. At Farrell, Pa., the Mercer Works of the American Sheet & Tinplate Co. is reported to have had 100,000 boxes of tinplate stored in warehouse last week, together with heavy tonnage of black sheets and heavier sheet metal. At its New Castle, Pa., plant, this same company, it is estimated, has had twice this quantity of tinplate in storage because of inability to move it.

Open Top Cars Used

In face of a 50 per cent box car supply, sheet makers have been compelled to use open top cars to ship black plates, using a tar paper covering to protect them. The box car shortage was increased by the blanket eastbound embargo on freight moving in closed carriers and produced an effectual blockade on tin plate destined for Eastern consumers. Because of this situation, some tonnage ready for shipment was diverted to buyers unaffected by the embargo restrictions. All export material consigned to the Atlantic seaboard has been thus affected for the time being.

Packers and can manufacturers are complaining of the delays in shipments. While much of the tin plate now stored in the district is unaffected by the eastbound box car embargo, it is nevertheless difficult for users of box cars to obtain this class of rolling equipment for westbound consignments. While makers admit they are taking a chance in shipping black sheets and tinplate in open cars, they say consumers are so pressed for material they are willing to take the hazard to secure deliveries.

The total number of cars of coal for industrial purposes in the Youngstown yards averages 50 per cent, and occasionally a little higher than half of the requirements. This shortage continues in spite of the fact that the large producers operate their own mines or control their operation and declare it is not due to diminished coal production, but to traffic difficulties.

Improvement Expected

Whether moderate weather will improve transportation appreciably is a mooted question, with some doubters, but it is generally felt there will be a marked betterment in coal supply.

Sheet makers are out of the market for second quarter deliveries and reduced rolling schedules will force much second quarter product into the third quarter. Consumers who have had their orders in for several months are being constantly disappointed on deliveries. It is predicted the price of sheets will shortly mount higher because of increased costs due to the recent wage advance. While the organized employees in sheet and tin plate divisions, who are members of the Amalgamated Association of Iron, Steel and Tin Workers will not share in the advance, being paid according to selling price of the product, all common labor will participate and such semi-skilled workers as machinists and electricians.

The semi-finished market continues in a sold-up condition, sheet bar makers being content to supply their regular customers to the extent of their ability.

Plates for second quarter delivery are being booked, the aggregate in the past two weeks being placed at 15,000 tons, including several good-sized bookings for railroad cars. Sales of plates for the domestic trade have been made at 3.75c.

The Consolidated Steel Co., export agent for five independents in this territory, is taking about 10 per cent of the production, dividing it according to capacity of the constituents.

Making "Metal Lumber"

The General Fireproofing Co., Youngstown, Ohio, has begun the manufacture of structural steel of a heavier grade than has heretofore been made, thereby entering the production of what is known as "metal lumber." Output at present consists of steel I-beams rolled and formed in a plant at Massillon, Ohio. The beams are rolled as strip steel and formed cold. After forming they are shipped to the Fireproofing company's plant at Youngstown, where they are cut to required sizes and lugs riveted on. Use of metal "timbers" of this kind is growing, replacing wood to a large extent in buildings where it is not desired to use I-beams rolled hot. The cold-rolled beams are lighter than the old-fashioned hot rolled structural steel and are more durable than wood. The cold former I-beams are described as being from 4 to 10 in. in depth, perfectly rigid and capable of carrying heavy loads. This production will not result in a new department, but is being handled as a development of established processes.

Chicago Lake Front Project Maturing

Secretary of War Baker has signed the governmental permit authorizing the Chicago's Lake front improvement plan, which includes the construction of large passenger and freight stations by the Illinois Central and the electrification of its lines in the city. On Feb. 24 the city will vote on an $8,000,000 bond issue for the first three years of the work. With the acceptance of the plan by the Illinois Central and Michigan Central Railroad, together with their $1,000,000 bond to carry out their part of the contract now on file with the city clerk, work on the project is expected to begin within 60 days.

Mr. Balfour's Views on Steel Conditions in the United States

WASHINGTON, Feb. 24.—Comments of Arthur Balfour, head of the Arthur Balfour Co. (Ltd.), tool and steel manufacturer of Sheffield, England, and president of the Sheffield Chamber of Commerce, following his recent trip to the United States, are given by Trade Commissioner Wilbur J. Page, who is at London:

"Mr. Balfour sums up his conclusions made from his contact with the steel manufacturers of America by saying that he feels that Sheffield steel manufacturers may be able to recover the position they held in the American market for high class steel, provided they can equal the service which is at present being given by the American mills," said Mr. Page. "He compliments the American steel mills by saying that they are very highly organized and are giving prompt domestic delivery. In order to regain their pre-war position, however, the Sheffield steel manufacturers will have to get back to regular work on a basis at least as efficient as that before the war in order to overcome their handicap by reason of the delay in ocean transportation. In his opinion present British railway, dock and transport facilities must improve very quickly, else the best efforts of the manufacturers to recover their American markets will be seriously handicapped.

"As an additional trade he believes that the British steel manufacturers will do a good business on the Continent for at least two years to come. After that time he thinks there will be a rebound caused by the enormous expenditure of capital and waste. He warns British steel manufacturers to be cautious and prepare for such a reaction. Generally speaking, he believes that there must be an inevitable aftermath of the war, bringing with it some years of bad trade."

Screw Thread Standardization

Washington, Feb. 24.—Although the final approval of the National Screw Thread Commission has not yet been placed upon its forthcoming report, practically all of the technical work has been done, and the details of the tables and definitions have been agreed to.

The document will be the most comprehensive publication of its kind and will carry authority throughout the iron and steel industry, as well as the machinery industry generally. In compiling a new set of definitions for screw-thread terminology the report will recommend the use of major diameter in place of the outside diameter formerly used to designate the outside diameter of the screw thread, as well as the full diameter of the thread of the nut. Similarly the term minor diameter is to be used in place of core diameter for the screw thread and inside diameter for the thread of the nut.

Another important section fixes the thread profile, to be known as the National Form of Thread, with precise details for basic angle, flat and depth, as well as clearance.

New England Foundries Closed

The New England foundry situation, as a whole, is nearer demoralization than it ever before has been. Railroads operating outside that section of the country have put an embargo on the Boston & Albany Railroad, New Haven and Boston & Maine freight owing to the congestion of cars at junction points. At the large New England freight terminals, the car congestion is fully as acute, in proportion, as it is at the junction points. For instance, there are something like 5000 New Haven cars to be moved at Providence and 2100 Boston & Maine cars at Boston. It will take a week in each instance, at least, to move these cars.

Virtually no pig iron has been delivered to New England foundries since Jan. 25. Unless something is done within the next fortnight or so, 15 to 20 of the largest foundries in that section of the country will have to suspend operations, and in that event several thousand men will be out of employment.

There are a large number of foundries which have enough pig iron to carry them along for some time, in some instances to next June. But these foundries lack coke in many instances and a general shut-down is expected unless the fuel situation is relieved within the immediate future. One foundry on the Cape has been closed two weeks, but has secured a car of coke, which it was obliged to truck a long distance. One of Lynn's largest industries will be seriously crippled by the enforced closing of the foundry unless coke is received within a day or two. The company may endeavor to haul coke in trucks over the road from the Everett plant of the New England Coal & Coke Co. Several smaller foundries have been closed a week or more either because of a lack of pig iron or coke and in some cases both.

New Blast Furnace Projected

The Miami Metals Co., Chicago, contemplates the erection of a 600-ton blast furnace and a 60-oven by-products coke plant at Muskegon, Mich. The stack will produce foundry iron. The company will also manufacture about 11,000,000 cu. ft. of gas daily.

The Victorian Railway Commissioners, Melbourne, Australia, last year sent three of their staff to the United States and Canada to study electric furnaces. The commissioners shortly will install an electric furnace at Newport to supply high-grade steel castings for the railroads, current being supplied from the railroads' power houses.

CONTENTS

A Novel Employees' Restaurant Plan 591
Effect of Pickling on Alloy Steels 593
Business Opportunities in Asia 595
Store room Equipment and Its Use 597
Effective Annealing of Metal Products 599
Lake Superior Iron Ore Shipments 600
Machinery Conventions at Atlantic City in May 600
Special Horizontal Spindle Drilling Machine for Crank Shafts 601
Portable Electric Heat Treating Furnace 602
Senate Committee Takes Action on Tungsten and Magnesite 603
Erectors Still Fight Union 603
Gasoline Tractor for Industrial Plants 604
Metal Tile System for Floors 604
Coal Profits Vanish 605
Method of Making Cement-Coated Nails 605
Improved Internal Grinding Machine 606
Induction Furnaces for Making Steel 606
Rod Cleaning Sand-blast Cabinet 606
Large Ore Business 607
Vise Designed for Pneumatic Drills 608
Employment in the Steel Industry 608
New Method of Testing Fragility of Metal Tubes 608
Convention of Mining and Metallurgical Engineers 609
Sales of Steel Rail Explained 611
Continuous Rails by Autogenous Welding 611
Trumbull Steel Co.'s Additions 611
Cold Saw for Cutting 24-In. Stock 612
Industrial Relations—Safety and Good Will 613
Deep Cutting of Bureau Appropriations Proposed 614
Lack of Freight Cars 615
Editorials: The Clouding Industrial Sky—Ruthless Treatment of Two Bureaus—Financing Essential Industries—Temperatures in Working Steel 616-617
Rail Shipments Delayed 618
Mr. Balfour's Views on Steel Conditions in the United States 619
Screw Thread Standardization 619
New England Foundries Closed 619
New Blast Furnace Projected 619
Changes in Steel at Certain Temperatures 620
What Is a Strike? 622
New Amalgamated Wage Schedule in Effect 622
National Gear & Truck Wheel Corporation Is Organized 623
Industrial Engineers to Meet at Philadelphia 623
New Canadian Electric Pig Iron and Alloy Plant 623
Iron and Steel Markets 624-635
Action For and Against Russian Trade 636
Export Situation 636
New Wire Nail Card 637
Non-Ferrous Metals 638
Personal 640
Obituary 641
Interstate Drop Forging Co. Organized at Milwaukee 642
Machinery Markets and News of the Works 643-653

Changes in Steel at Certain Temperatures*

Effect on Static and Other Properties of Treatment Below the Thermal Critical Range—Practical Value of the Results

BY DR. ZAY JEFFRIES

IT has been known for centuries that iron and steel could be hardened by cold hammering and that the metal could be restored to the normal condition by heating to a red heat and cooling either rapidly or slowly with nearly pure iron and slowly with steels containing considerable carbon. The art of tempering steels is also very old. When a medium or high-carbon steel is quenched from a cherry-red heat, the hardness is increased; this hardness can be reduced by heating to various temperatures below the lower thermal critical point, which is near 700 deg. C. The present paper will not consider these old and well-known changes in iron and steel below the thermal critical range, but will confine itself to the more unusual changes, some of which have been studied recently. Stromeyer, for example, in 1886, reports that both working steel and heat treatment of steel in the blue-heat range are highly injurious. Recently, however, some metallurgists believe that the straightening of warped steel forgings at a blue heat produces a beneficial effect on the metal.

General Observations

The tensile strength of nearly pure iron, such as Armco iron or wrought iron, is about 40,000 to 50,000 lb. per sq. in. (2812 to 3515 kg. per sq. cm.) at room temperature. The strength increases with rising temperature up to about 200 deg. to 250 deg. C.; the maximum strength is usually 15 to 25 per cent, and in one instance 37.6 per cent, greater than that at room temperature. The strength increases gradually, from a minimum, throughout a temperature range of about 200 deg. C. and then decreases gradually for an additional 100 deg. C.; after this, the rate of decrease of strength with increase in temperature becomes rapid. It seems that the greater the carbon content the greater is the magnitude of the increase; but the high-carbon steels do not necessarily show as large an increase in percentage of strength as the low-carbon steels.

The elastic limit of iron and steel at elevated temperatures is reported by Martens to be the same at 250 deg. C. as at room temperature, passing through a maximum at about 200 deg. C. Howard, on the other hand, states that the elastic limit of steel decreases continuously with a rise in temperature.

Recently H. J. French, of the U. S. Bureau of Standards, has determined carefully the elastic limit as well as other tensile properties of mild steel and checks Martens' results; the elastic limit is about the same at 250 deg. C. as at room temperature and it passes through a maximum value at 200 deg. C. about 15 per cent greater than that at room temperature.

The elongation of iron and mild steel decreases above room temperature and passes through a minimum between 100 deg. and 300 deg. C. and then increases up to 500 deg. C. The elongation at 500 deg. C. is greater than that at room temperature. The reduction of area of iron and mild steel seems to increase at temperatures slightly above room temperature and then decreases, passing through a minimum about 300 deg. C. and then increases up to about 500 deg. C. Above 500 deg. C. the elongation and reduction of area both vary markedly with grain size and the rate of loading.

Recovery of Elasticity After Overstrain

Prof. H. M. Howe has called attention to the fact that recently deformed mild steel loses its elasticity. The effect of rest at room temperature is to slowly restore the elasticity and eventually to raise it above the load that caused the previous deformation. The effect of warming is to greatly hasten the recovery of elasticity. J. Muir found that steel containing about 0.2 per cent carbon recently quenched from a red heat was imperfectly elastic when tested immediately, but when deformed in this state it immediately became perfectly elastic, up to the load that produced the deformation.

Effect of Permanent Deformation in the Blue-heat Range

The author has made tests on blue-heat deformation of Armco iron and has compared the tensile properties both at ordinary and at elevated temperatures. The following conclusions are made from this work:

Armco iron deformed at room temperature a given amount does not increase as much in tensile strength as when deformed the same amount at blue heat.

When Armco iron is drawn cold, its tensile strength at 200 deg. to 300 deg. C. is greater than at room temperature with moderate reductions by drawing; but with 96 per cent reduction of area by cold drawing, the tensile strength is greater at room temperature than at any higher temperature. The tensile strength temperature curve, however, shows clearly that it passes through a change point inasmuch as the strength does not decrease as rapidly from 15 deg. to 300 deg. C. as from 300 deg. up. The decrease in strength is also much more rapid from 190 deg. C. to 15 deg. than from 15 deg. to 300 deg. C. (liquid air temperature).

The effect of drawing Armco iron wire at 200 deg. to 400 deg. C. is to produce greater tensile strength at all temperatures up to 550 deg. C. than would obtain with the same amount of deformation in the cold. The elongation is less after drawing at 200 deg. to 400 deg. C. than after drawing the same amount at room temperature. The same conclusion is true in general of the reduction of area.

The results given by W. E. Ruder, in Table 1, show the effect of rolling cold and at various elevated temperatures on the strength of mild steel. His results on a nickel-chromium steel in the annealed condition are given in Table 2.

Table 1.—Effect of Rolling Hot and Cold on the Tensile Strength of Mild Steel.

	Ultimate Strength Lb. Per Sq. In.
0.192 in. diameter	58,200
annealed	55,200
0.192 in. diameter	67,000
Reduced to 0.179 in. cold	69,500
0.192 in. diameter	110,200
Reduced to 0.179 in. at 240 deg. C.	112,300
0.192 in. diameter	112,700
Reduced to 0.179 in. at 300 deg. C.	113,500
0.192 in. diameter	114,100
Reduced to 0.179 in. at 400 deg. C.	105,300

Table 2.—Results on Nickel-chrome Steel

	Tensile Strength, Lb. per Sq. In.	Yield Point Lb. per Sq. In.	Per Cent Elongation, 2 In.
Annealed	101,500	67,100	25.5
Annealed, then reduced 10 per cent at 300 deg. C.	137,600	132,500	10.5
Heat treated and reduced 10 per cent at 300 deg. C.	199,100	163,700	7.5
Annealed and reduced 10 per cent cold	114,200	102,000	19.5

Effect of Ageing on Tensile Properties

Reinhardt and Cutler found that steels containing 0.35 to 0.45 per cent carbon gave no trouble in obtaining the necessary physical properties when the samples were machined and tested immediately after heat treatment; but in steels containing carbon between 0.49 and 0.55 per cent, the tests taken from billets 5¾ in. (14.6 cm.) square showed inferior elongation and

*From a paper presented at the February meeting of the American Institute of Mining and Metallurgical Engineers in New York. The author is director of research, Aluminum Castings Co., Cleveland.

reduction of area if tested immediately after heat treatment and machining, whereas after resting at room temperature for even 12 to 24 hr. the results were increased sometimes more than 100 per cent. Heating to 120 deg. C. effected this increase more quickly than room temperature ageing. Test bars turned from ingots of steel having the same chemical composition rolled to 1⅞-in. square billets did not show the inferior values in elongation and reduction of area immediately after treatment. That ageing was necessary to increase the ductility of forgings has been known, or at least suspected, for many years, but the results given by Reinhardt and Cutler give unquestionable quantitative evidence on this subject.

Effect of Quenching Nickel-chromium Steels

The Midvale Steel Co. has, for several years, known that certain nickel-chromium steels have low resistance to impact when cooled slowly from the tempering heat (about 600 deg. C.), but if quenched from the tempering heat the impact values are satisfactory. Philpot gives many impact results on nickel-chromium steels showing the increased resistance produced by quenching from the tempering heat. This property in nickel-chromium steels is known as "blue brittleness." All steels of this class do not show the phenomenon of blue brittleness. It seems to be more pronounced in acid than in basic steel. The ratio between the impact values of the steel quenched from the tempering heat and that cooled slowly from the tempering heat may be considered as a rough measure of the susceptibility to blue brittleness. Some steels cooled slowly from the tempering heat show a higher impact resistance than when quenched from this temperature. Of one series of 20 tests, three showed higher impact values after slow cooling and 17 showed higher values after quenching. The ratio of impact resistance after quenching to that after slow cooling from the tempering heat varied from a little less than unity to 13. The general type of steel considered is typified by the following analysis: Carbon, 0.40 per cent; nickel, 2.75 per cent; chromium, 0.85 per cent; manganese, 0.8 per cent; sulphur, 0.035 per cent; phosphorus, 0.025 per cent.

It is not certain that the steels having low impact values, provided the tensile properties are good, are unfit for use for aircraft-engine crankshafts or for similar purposes. It is considered safer, however, at the present time, to treat for a high impact value.

General Discussion

The changes in the tensile properties of iron and steel with a rise in temperature are best explained by assuming a low-temperature allotrope in iron. Since all of the tensile properties change gradually with a rise in temperature rather than abruptly at a given temperature, the change from one allotrope to another would be considered to take place gradually. The point of maximum tensile strength need not be considered as the temperature at which the allotropic change on heating has been completed, but it would seem that the change takes place gradually between ordinary temperature and about 350 deg. C. The temperature of maximum strength might well correspond to the physical state of the metal in which both allotropes are present in about equal proportions.

The difficulty of explaining the tensile properties of iron at elevated temperatures without assuming the existence of an additional low-temperature allotrope seem to the writer almost insurmountable. The changes in tensile strength and elastic limit are opposite to those normally expected by increase in temperature. The magnitude of these changes of properties are such as to leave no doubt as to the existence of a maximum point in tensile strength and elastic limit at about 200 deg. to 250 deg. C. If a change within the grains of this crystalline material takes place between room temperature and 500 deg. Fahr., why not call this an allotropic change? We have no other name for such a change at present. It should not be necessary for one allotrope to change to another at a specific temperature.

All of the results produced by cold deformation, as well as blue deformation reported above, accord nicely with the theory of the existence of a low-temperature allotrope in iron. The failure to discover sharp changes in thermal and electrical conductivities of iron and steel with a rise in temperature is not necessarily evidence against the existence of a low-temperature allotrope in iron. The explanation of some of the ageing results described above is at the present time very problematical. It is certain that atomic rearrangements of considerable magnitude take place in iron and steel at room temperature. Nearly all of the ageing results, however, indicate an equilibrium condition of the metal reached after a long period at room temperature or a short period at 100 deg. C. Still higher temperatures may produce internal changes not reached in room-temperature ageing.

Having taken the stand that the tensile and deformational properties of iron and steel could not be explained without assuming the existence of a low-temperature allotrope, let us see if this assumption also assists in the explanation of some of the other observations noted.

The formation of folds would indicate a volume change from one allotrope to another and also would indicate that the rate of change from one allotrope to another is so slow that quenching prevents the transformation from taking place during cooling but allows it to take place at the temperature of the quenching bath. It is reported that quenching alone from blue heat affects the properties of steel. This can be explained readily by assuming a low-temperature allotrope. The spontaneous generation of heat, the contraction, and the decrease in electrical resistivity at ordinary and slightly elevated temperatures in hardened and untempered high-carbon steels are probably results of the same internal changes. Blue brittleness in nickel-chromium steels seems to involve relative changes in properties of the grain-boundary material and the grain material.

Practical Value of Work

The question of hot straightening of warped forgings is important; and if straightening bent forgings at a blue heat is detrimental, this fact should be known. It is also conceivable that the variations in properties of iron and steel produced by blue-heat deformation might be taken advantage of for useful purposes in the future. The old-time practice of tempering high-carbon steel at temperatures so low that no appreciable change in hardness occurs is seen, from the above description, to have good scientific foundation. The slow changes in volume at room temperature may even produce cracks in high-carbon steels quenched but not tempered. This is so pronounced in certain large pieces that the tempering must follow the quenching almost immediately, to avoid the formation of so-called quenching cracks. In certain steels quenching in hot water and oil are resorted to because cold-water quenching might produce these cracks before the steel could be removed from the bath or even during cooling.

Rosenhain and Archbutt report the formation of intercrystalline cracks that, eventually, produce failure in mild-steel boiler plates. These boiler plates are used at a relatively high temperature and it is the belief of the authors that the long-sustained load at the high temperatures causes the amorphous cement at the grain boundaries to gradually flow and eventually break without deformation of the grains. This involves the study of the action of steel under sustained loads at elevated temperature, which subject is now being investigated by H. J. French at the Bureau of Standards.

Quenching nickel-chromium steels from the tempering heat is resorted to in many cases to increase the resistance to impact. While there may be criticisms to the effect that the high impact values so produced are unnecessary, there seems to be no contention that such steel is inferior to that which has been slowly cooled.

In conclusion, it may be stated that information on all of the subjects treated in this paper will help, either directly or indirectly, in the production, treatment and control of iron and steel with properties more suitable to the uses of mankind.

WHAT IS A STRIKE?

Question Submitted to Industrial Board, But Is Not Decided

HARRISBURG, PA., Feb. 24.—The principal concern of iron and steel men in the industrial conference held here last week under the auspices of the Pennsylvania State Industrial Board centered about the question of when an industrial dispute becomes a strike. Iron and steel men in attendance at the conference asked the board to make a ruling, but this board has since issued a statement to the effect that it will issue no general ruling, but will decide when a specific case comes up.

With the holding of this conference, the State Industrial Board will be called on to make rulings such as it was originally intended to do and will figure considerably in the matter of regulation in the industrial adjustment that is coming. The conference has been asked to form an advisory group to work with the state board.

Following an address by Commissioner Connelly in which he spoke of the necessity of getting the State agencies and the corporation bureaus into a better working agreement in regard to supplying labor, it was arranged that the State department should be a central agency for information as to supply of labor, and that the advisory group should consist of Earl B. Morgan, Philadelphia; Elmer F. Harris, West Homestead; Charles T. Miley, Reading; J. F. Reeves, Erie, and Thomas E. Conway, Easton.

The conference named a committee to draft its ideas, Mr. Harris being chairman, and after a long discussion it was decided that the State Industrial Board should be asked to rule when a dispute becomes a lockout and when it ceases. The question of notice came up for discussion and it was brought out that in shipyards, for instance, men in one branch may quit and the question arises whether the whole plant should be considered to have a strike.

The committee also suggested a plan for the reviving of representative councils at employment agencies of the State whereby the agencies can report strikes or disputes to the bureau of mediation and if the decision is not satisfactory, can appeal to the State Industrial Board.

W. F. Long, Pittsburgh, suggested that the representative councils contain men representing non-union labor, the closed and the open shop. Robert Haight outlined to the conference plans of the State Chamber of Commerce in regard to betterment of housing. The conference opposed desk room in agenices of the State for representatives of industry.

New Wage Schedule in Effect

First payment under the new wage schedule in the steel industry was made this week in the Youngstown district, for the first half of February. The advance affects all day and tonnage men except members of the Amalgamated Association of Iron, Steel and Tin Workers in departments of mills having contracts with the unions. These expire automatically July 1. Salaried men up to and including $3,600 a year will receive a 10 per cent increase. There will be some advances above $3,600 a year, but in general the increase is not carried beyond that limit. Under the old rates, common laborers were paid 42c. an hour for eight hours and time a half for overtime, earning therefore in a 10-hr. day $4.62. Under the new rate, 10-hr. laborers will be paid $5.08, while those working 12 hours will receive $6.47 as compared with $5.88 under the old rate. Under the new scale, common labor will be paid the highest wage ever distributed in the industry for such work, and will receive higher compensation than skilled workers in many other lines. Fabricators and associated industries have all advanced wages proportionately.

The Kokomo Steel & Wire Co., Kokomo, Ind., has set aside 80 acres of land upon which homes for employees will be erected.

In the Field of Labor

To attract office and mill workers from Youngstown, Ohio, the Newton Steel Co., which is about to start its sheet mill plant at Newton Falls, Trumbull county, has obtained special passenger rates on the Pennsylvania and Baltimore & Ohio railroads. Commutation tickets of 50 trips will be available.

The "minimum wage" bill, recently introduced into the Kentucky House of Representatives, was killed on motion of Representative Bryson of Covington. More than a hundred manufacturers from various sections of the State held a meeting at Covington, Ky., to protest against its passage. The principal objections to the bill were that it did not fix any minimum wage to be paid, but defined it as a sum adequate to supply employees with the necessary cost of living to maintain health and protect their morals. No standard of living was fixed.

Five hundred employees of the Mosler Safe Co., Hamilton, Ohio, have gone on strike because the management refused to reinstate one of their number recently discharged after repeated warnings to discontinue delaying production in the factory.

The Robbins & Myers Co., Springfield, Ohio, has purchased the Warder Park addition, covering an area of 12 blocks, and including 60 homes in course of construction, which they plan to complete and sell to their employees. On the remaining property they will build additional houses as they may be required. The houses will be sold to the employees at cost.

In an effort to assist the laboring man to meet the high cost of living, a co-operative grocery has been opened in the plant of the Sidney Machine Tool Co., Sidney, Ohio. All commodities will be sold to the employees of the company at wholesale prices, plus a small charge for handling.

About 1100 men of the Baltimore Dry Docks & Shipbuilding Co., Baltimore, went on strike Feb. 20 following the reduction of two members of the supervisory force to mechanics, first-class. The men are the only two out of 167 who were ordered to withdraw from the unions by Feb. 16, who failed to comply with the order, which was issued by Holden A. Evans, president. The strike followed their reduction. The strikers include 500 pipefitters, 450 carpenters and 150 joiners.

Intermittent strikes by the bridge and structural iron workers' union against certain structural steel contractors in Chicago have been ordered stopped by the Chicago Building Trades Council. The iron workers had acted out of sympathy with striking employees of fabricating shops in the city. The order terminates a situation which has restricted erection work for several months.

The Millers Falls Co., Millers Falls, Mass., hollow augers, etc., on March 1, will put into effect new working conditions at its plant. From that date there will be a 47-hr. weekly schedule, work being from 7.30 a. m. till noon, and from 1 p. m. till 5, closing at noon on Saturday. On April 1 work will be from 6.30 a. m. till 11, and from noon till 4 p. m., closing at 11 a. m. Saturday, this schedule to continue until the last week in October. An increase in wages will offset the loss in time.

Employees of the James Hunter Machine Co., North Adams, Mass., drills, wool dryers, etc., are working on a 55-hr. weekly basis, instead of 48 as heretofore, in an effort to increase production. They will receive extra compensation for the extra work.

The welfare committee, composed of employees of the Heald Machine Co., Worcester, Mass., is operating a newly enlarged and equipped lunch counter. It is located in the main corridor of the plant opposite the screw machine department. Food is sold at cost or nearly so, operating expenses being largely derived from the sale of tobacco, cigarettes, cigars and tonic. Employees are served at the rate of 150 per ten minute periods.

National Gear & Truck Wheel Corporation Is Organized

PITTSBURGH, Feb. 24.—The National Gear & Truck Wheel Corporation, Pittsburgh, has been selected as headquarters for the National Gear & Truck Wheel Corporation, a new entry in the industrial field. The company, which is capitalized at $2,250,000, has taken over six concerns, two in Pennsylvania, one in Ohio, and three in Illinois, and proposes to add a seventh in the near future. The companies consolidated are the National Gear Wheel Foundry, Inc., and the Pittsburgh Wheel Corporation of Pittsburgh; the Mead Mfg. Co., Columbus, Ohio, and the Chicago Auto Wheel Co., the Wheel of Fortune Co. and the Giant Truck Wheel Corporation of Chicago. The seventh concern to be acquired is the John H. Nusser Foundry, of this city. Officers of the corporation are: President and sales manager, A. L. Schultz, president of the Schultz Bridge & Iron Co.; first vice-president and general manager, A. H. Peabody, formerly with the Pressed Steel Car Co.; second vice-president and works manager, A. S. Harkless, formerly with the Westinghouse interests; treasurer, Robert W. Barbour, former secretary of the Pittsburgh Chamber of Commerce; secretary, I. B. Trout, formerly with the Giant Wheel Truck Corporation. Directors include Thomas MacDonald, connected with the Pittsburgh Water Bureau; Charles J. Koch, a merchant of the North Side, and Francis Mead, president of the American Cushion Wheel Co., Chicago. The company will manufacture all kinds of motor truck and automobile devices, particularly motor truck wheels and gears. It has obtained sole ownership of all patent rights vested in the Mead cushion wheel, the Fromman steel cushion wheel, the National wheel and the Universal cushions, also the corporation will continue on an enlarged scale the regular business of the acquired companies, which consists mostly of the manufacture of wheels for motor trucks, trailers and tractors. Consolidation of the six industrial concerns was effected by John P. Bracken of the House building, and he will participate actively in the new concern.

Wishes to Buy Machine Tools

The Liberty Systems Corporation, 111 West Washington Street, Chicago, manufacturer of account, filing and finding machines and payroll scheduling machines, desires to buy $50,000 to $100,000 worth of machine tools or will purchase a typewriter or adding machine plant complete. It also offers as an alternative to take over any new machinery orders for early delivery now on hand and to pay a premium therefor. The list of tools the company wishes to purchase includes 5 No. 2, 3 No. 00, 4 No. 0, 2 No. 1 Brown & Sharpe automatic screw machines, 2 No. 0 B. & S. cut off machines, 2 No. 2 B. & S. turret forming machines, one B. & S. vertical milling machine, one Norton surface grinder, and punch presses as follows: One No. 7-A Bliss double crank, one No. 25 Bliss double crank, six No. 5 Niagara or Bliss presses of equal size, two No. 4 Niagara or Bliss presses of equal size, four No. 20 or No. 21½ Bliss presses, two No. P-4 Ferracute presses.

Machinery Companies Merged

The F. C. Austin Co., Chicago, has merged with the Linderman Machine Co., Muskegon, Mich. The combination of the Austin and Linderman plants will increase eight-fold the present output of the Austin company, giving it, it is believed, the largest capacity for the production of earth-loading and cement-working machinery in the United States. A new company, styled the F. C. Austin Machinery Co., has been incorporated to take over the merged properties, including the F. C. Austin Co., Inc., the Municipal Engineering & Contracting Co., and the Muskegon plants of the Linderman Steel & Machine Co. F. C. Austin has retired from the active management of the company and B. A. Linderman, president of the Linderman company, has assumed control. General offices will be in the Railway Exchange Building, Chicago, in the present quarters of the F. C. Austin Co.

Industrial Engineers to Meet at Philadelphia

Under the major subject of the practical application of the principles of industrial engineering, the Society of Industrial Engineers will discuss the following topics at the national spring convention at the Bellevue-Stratford Hotel, Philadelphia, March 24, 25 and 26: Functions of the managing executive, work of the professional industrial engineer, the technical man and accountant as industrial engineers and the industrial engineer as educator and economist.

There will be two exhibitions, as follows: A, equipment and appliances designed to reduce fatigue; B, charts, production control plans, planning and dispatching forms, personnel records, standard practice instruction books, etc. There will be two sessions daily, beginning at 2 and 7.30 p. m. The forenoons will be devoted to visits to some of the most progressive plants in Philadelphia. Arrangements are being made through the business manager's office, 327 South La Salle Street, Chicago. The program follows:

"What the Principles of Industrial Engineering Actually Accomplish When Applied by the Four Classes of Industrial Engineers," L. W. Wallace, president; "The Work of the Industrial Executive," Frank A. Scott, vice-president the Warner & Swasey Co., Cleveland; "Executive Direction of Industrial Relations," Dudley C. Kennedy, Philadelphia; "Results Obtained by the Application of Industrial Engineering Work to Army Construction Work," Major Harry F. Porter, Q.M.C.; "The Dividends Earned by Safety First," J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown, Ohio; "What the Industrial Medical Department Accomplishes," R. S. Quimby, M.D., service manager Hood Rubber Co., Watertown, Mass.; "The Red Cross as an Industrial Factor To-day," George R. Laird, special field representative the American Red Cross; "The Most Effective Type of Industrial Organization," C. E. Knoeppel, industrial engineer, New York; "Definitions of Terms Used by the S. I. E.," Dr. Lee Galloway, New York University; "Training Foremen as Executives," John Calder, Swift & Co., Chicago; "Fatigue Study—the First Step in Better Industrial Relations" (illustrated), Frank B. Gilbreth, industrial engineer, Montclair, N. J.; "Financing for Stability," F. C. Schwedtman, vice-president National City Bank of New York; "How the Cost System Assists the Management in the Reduction of Operating Costs," William B. Ferguson, assistant to the president American International Shipbuilding Corporation, Hog Island, Pa.; "Saving the Man by Wearing Out the Machine" (illustrated), Walter N. Polakov, consulting engineer, New York; "The Value of Team Work Among Engineers," L. P. Alford, editor *Industrial Management*; "How Industry Can Assist the Educator," Dexter S. Kimball, Cornell University; "How the Industrial Engineer Increases the Earning Power of Industry," Harrington Emerson, New York; "The Need for Industrial Preparedness," Major-General C. C. Williams, Chief of Ordnance, U. S. A.

The final session Friday evening will be banquet night, the speakers being Dexter S. Kimball, Harrington Emerson and Major-General Williams.

New Canadian Electric Pig Iron and Alloy Plant

The electric furnace plant of Fraser Brace & Co., erected at Shawinigan Falls, Que., during the war, and the iron foundry of Normandin Brothers have recently been acquired by Shawinigan Foundries, Ltd. G. G. McCartney, who operated the electric furnace plant for Fraser Brace & Co., is president of the new company, W. G. Dauncey vice-president and metallurgist and Capt. C. M. Hallis secretary-treasurer. It is the intention of the company to continue the manufacture of pig iron in one electric furnace, pending developments which may lead to the production of ferroalloys and special steel. Additions to the plant are contemplated so as to enable the iron foundry to cope with the demand for the ordinary run of castings. Arrangements have also been completed for carrying on brass foundry work and to put a special grade of semi-steel castings on the market.

The United States High Speed Steel & Tool Corporation, now operating a plant at Toledo, Ohio, and building another plant at Green Island, N. Y., has opened an office in room 995 Union Arcade, Pittsburgh, in charge of W. J. Clyde, as sales manager for the Pittsburgh district. Mr. Clyde for some years was connected with the sales department of the Carnegie Steel Co., Pittsburgh.

Iron and Steel Markets

RAILROAD BUYING NOTABLE

Locomotives, Cars, Car Repairs and Spikes

General Buyers Becoming Hesitant—Wire Card of Independents—Rails at $57

Steel makers show as yet little disposition to open their books for forward business. They are to this extent confident of continuing activity. Against this may be put a tendency here and there among consumers to take their chances in waiting for lower prices. But the unabated demand on top of the present commitments appears sufficient to require full mill occupation for a long time, particularly under existing obstacles to production. Transportation has grown no worse and in Chicago the leading interest has again reached 85 per cent of capacity operation.

The decision of one notable producer to sell for second quarter may point toward the end of price advances, as these bookings will be made at 4c. for plates, shapes and bars, but the initiative in all negotiations is still with the buyer. There are signs that the bulk of third quarter delivery purchases yet to be made will be done at higher prices than now are the average, possibly $2 a ton above the war level of prices. These were regarded as satisfactory in terms of the then existing scale of costs and the advance, it is emphasized, would not absorb wholly the subsequent increases in cost and those which are imminent with the return to private ownership of the railroads. Also the independent manufacturers claim that they cannot absorb like the United States Steel Corporation is doing the recent advance in wages.

One group of iron and steel consumers who are feeling the combined effect of high prices and deferred deliveries of their products are the machine tool builders, but even here the hesitation of buyers is not marked.

The interest of the trade is now naturally centered on the scale and scope of the buying on the part of the railroads. The New York Central has put out inquiries for 150 locomotives and 13,200 cars, of which 10,400 are heavily steel, part steel hopper cars and part all steel box cars, and the Rock Island is inquiring for 35 locomotives and 3250 cars. The Union Pacific has bought 102 locomotives and the St. Paul wants 100. The Great Northern has ordered 1000 cars and the Soo Line 300.

In appreciation of the needs of industry in general for better movements of raw and finished products the steel companies are showing a disposition to give preference to railroad requirements. The Steel Corporation has undertaken to furnish 22,000 tons for car construction and repairs.

The Baltimore & Ohio has bought 5000 tons of plates for car repairs and the Pennsylvania is about to order 7000 tons; in both cases 4c. per pound, Pittsburgh, will prevail.

At least three rail makers are holding out for $57 a ton for rails, $10 above the minimum price. One company has named this on 12,000 tons for the Pennsylvania and another has sold to two railroads a total of 2700 tons at $57. An Eastern road is facing the prospect of paying the same price on upward of 25,000 tons.

Nearly 100,000 kegs of spikes are being figured on for the railroads, with more to come.

The new card of extras on wire nails, issued by several independent companies, makes an advance of 22c. per keg, to conform to their increased costs of manufacture. Since September, 1917, when the Government fixed the price at $3.50 per keg, the wire nail business, it is claimed, has been done at a loss. About 1,000,000 tons are consumed annually in normal times and it is estimated that 20,000,000 kegs of nails will be made this year.

The outlook for oil developments still promises to take the output of pipe mills for two or three years. Although several makers are operating at nearly normal capacity output is not more than 75 or 80 per cent of what it should be, due to the decreased labor performance.

Another advance in cast-iron pipe is presaged by instances of $4 to $5 premium in going business.

With coke deliveries 25 to 50 per cent of requirements, foundries in the Middle West have had to use part egg-size by-product coke costing $12 and New England by-product coke at $18 delivered has found a market in Cleveland. Material advances in both furnace and foundry coke are likely if, as expected in some quarters, the Government will give up control of prices after the return of the railroads to private ownership.

Selling of pig iron has been only moderate. A Michigan automobile manufacturer bought 20,000 tons of foundry and malleable and a large steel foundry at Chicago bought 14,000 tons of basic. While a fair tonnage of Southern iron has been sold at $42, iron is still obtainable at $40 and on the whole the tendency upward of pig iron prices seems to be arrested. At least a part of the basic sold at Chicago is reported to have brought $3 less than the recent Valley price. One the other hand, basic in eastern Pennsylvania has advanced $2.

Consumers' stocks of ferromanganese have become sufficiently low that the spot alloy has brought $200 to $225, delivered. The American made product for third quarter is quoted at $170, delivered, while the British product for second quarter has sold up to $165, seaboard, with some fear that full shipments may not be received.

Pittsburgh

PITTSBURGH, Feb. 24.

The financial situation is causing some anxiety to the steel trade, and is held mainly responsible for the lull, or whatever name it may be called, that has taken place in the last week, mostly in raw materials, such as pig iron and scrap. There is no thought as yet of any serious set-back in the steel trade, but it is true that there is less activity in pig iron, semi-finished steel, iron and steel scrap and perhaps for two or three items in finished steel than there has been for a considerable time. There is no sign as yet of any lower prices on pig iron, but there is more inclination on the part of several producers to sell for last half of this

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 24. 1920	Feb. 17. 1920	Jan. 27. 1920	Feb. 25. 1919
No. 2 X, Philadelphia‡	$45.35	$45.35	$44.35	$36.15
No. 2, Valley furnace†	42.00	42.00	40.00	31.00
No. 2 Southern, Cin'ti†	43.60	43.60	43.60	34.60
No. 2, Birmingham, Ala.†	40.00	40.00	40.00	31.00
No. 2, furnace, Chicago*	43.00	43.00	40.00	31.00
Basic, del'd, eastern Pa.	**43.40**	41.40	39.25	33.90
Basic, Valley furnace	43.00	43.00	40.00	30.00
Bessemer, Pittsburgh	43.40	43.40	42.40	33.60
Malleable, Chicago*	43.50	43.50	40.50	31.50
Malleable Valley	43.00	43.00	41.00	31.50
Gray forge, Pittsburgh	42.40	42.40	40.40	31.40
L. S. charcoal, Chicago	57.50	57.50	52.50	38.85
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pitsburgh	58.00	58.00	48.00	43.50
O.-h. billets, Pittsburgh	58.00	58.00	48.00	43.50
O.-h. sheet bars, P'gh	60.00	60.00	50.00	47.00
Forging billets, base, P'gh.	75.00	75.00	64.00	56.00
O.-h. billets, Phila	64.10	64.10	59.10	47.50
Wire rods, Pittsburgh	65.00	65.00	60.00	57.00
Finished Iron and Steel				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.25	4.25	3.75	3.145
Iron bars, Pittsburgh	4.00	4.00	3.50	2.90
Iron bars, Chicago	3.50	3.50	3.00	2.92
Steel bars, Pittsburgh	3.00	3.00	2.75	2.70
Steel bars, New York	3.27	3.27	3.27	2.97
Tank plates, Pittsburgh	3.50	3.50	3.00	3.00
Tank plates, New York	3.77	3.77	3.27	3.27
Beams, etc., Pittsburgh	2.70	2.70	2.55	2.80
Beams, etc., New York	2.97	2.97	2.82	3.07
Skelp, grooved steel, P'gh.	2.45	2.45	2.45	2.70
Skelp, sheared steel, P'gh	2.65	2.65	2.65	3.00
Steel hoops, Pittsburgh	3.50	3.50	3.25	3.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Feb. 24. 1920	Feb. 17. 1920	Jan. 27. 1920	Feb. 25. 1919
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	5.00	5.00	4.60	4.70
Sheets, galv., No. 28, P'gh.	6.50	6.50	5.95	6.05
Sheets, blue an'l'd, 9-10	4.25	4.25	3.80	3.90
Wire nails, Pittsburgh	4.50	4.50	4.50	3.50
Plain wire, Pittsburgh	3.50	3.50	3.25	3.25
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.35
Tin plate, 100-lb. box, Pgh.	$7.00	$7.00	$7.00	$7.35
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$41.50*	$38.00	$36.00	$21.00
Carwheels, Philadelphia	**42.50**	40.00	38.00	23.00
Heavy steel scrap, P'gh.	*27.00*	28.00	27.50	14.00
Heavy steel scrap, Phila.	25.00	25.00	26.00	14.00
Heavy steel scrap, Ch'go.	*24.00*	24.50	24.00	14.50
No. 1 cast, Pittsburgh	34.00	34.00	33.00	18.00
No. 1 cast, Philadelphia	40.00	39.00	38.00	23.00
No. 1 cast, Ch'go (net ton)	*37.00*	38.50	39.50	20.50
No. 1 RR. wrot, Phila.	36.50	36.50	35.00	20.00
No. 1 RR. wrt. Ch'go (net)	26.00	26.00	26.00	14.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$4.25
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	5.00
Foundry coke, future	7.00	7.00	7.00	7.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.25	19.25	19.50	16.25
Electrolytic copper, N. Y.	19.00	19.00	19.25	15.50
Spelter, St. Louis	**9.00**	8.75	9.10	6.25
Spelter, New York	**9.35**	9.10	9.45	6.60
Lead, St. Louis	**8.75**	8.50	8.45	5.00
Lead, New York	**9.00**	8.75	8.75	5.25
Tin, New York	**64.00**	60.00	62.25	72.50
Antimony (Asiatic), N. Y.	11.62½	11.62½	11.25	7.12½

year at present prices, if such business can be closed. There is not the eagerness on the part of buyers to anticipate their wants for last half that was so prevalent recently. The market has been going at a pretty rapid pace for some months, pig iron having gone up $15 per ton or more since last November, and the present lessened activity is therefore only natural.

The car situation is no better, and railroad embargoes are on in nearly every direction. Lately the opinion is given that there is a sad deficiency in motive power, this having been very noticeable last week in the coke region. One day the car supply is better, the next day it is worse than ever, but the general average shows no betterment. Steel mills are piling up finished products in warehouses in large quantities, and this is adding to the distress of consumers, who need this steel very badly. It is also increasing the offers of premiums for finished steel products that are now common. Manufacturing and shipping conditions are certainly discouraging, and there seems to be no relief in sight. All this is adding to costs, which have climbed very rapidly in the past few months, first because of the 10 per cent general advance in wages effective in most steel plants from Feb. 1 and from lessened operations, due to scarcity of fuel and cars.

Pig Iron.—In point of inquiry, the past week in the pig iron trade has been the quietest in this district for some months. There is very little inquiry, consumers being pretty well covered for first half of this year and are not strongly interested in offers of iron at present prices for last half delivery. A sale of 3000 tons of Bessemer iron is said to have been made at $45 at furnace, but it could not be confirmed. If such a price was paid it probably was for Bessemer iron of some special analysis. Out-put of pig iron this month will show a large decrease below January, due to the shorter months, and also to the scarcity in supply of fuel. No large inquiries are in the market at present for pig iron, but prices are showing no signs of receding.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being $1.40 per gross ton:

Basic	$43.00 to $44.00
Bessemer	42.00
Gray forge	41.00 to 42.00
No. 2 foundry	42.00 to 43.00
No. 3 foundry	40.50 to 42.00
Malleable, Valley	43.00 to 44.00

Ferroalloys.—There is an insistent demand for ferromanganese for shipment over last half of the year, and several fairly large sales are reported at $160, delivered, for 76 to 80 per cent domestic. Several cargoes of English ferromanganese have been greatly delayed in delivery, with the result that some steel workers that were depending upon this material did not get it, and are trying to buy some for prompt shipment. It is said there have been several sales of one and two carload lots for prompt delivery of domestic ferromanganese at as high as $200, delivered. The inquiry for other grades of ferroalloys is fairly active, and prices are firm.

We quote 76 to 80 per cent domestic ferromanganese $160 to $165 for second half delivered, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $85 to $90, and 18 to 22 per cent spiegeleisen at $55 to $57.50, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $45.75 to $46.25; 7 per cent, $50 to $50.50; 8 per cent, $52 to $52.50; 9 per cent, $54 to $54.50, and 10 per cent, $56.50 to $57. An advance of $3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which has a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—Reports are current in the trade of sales of billets at as high as $70 and sheet bars at close to $80 for prompt shipment, but if these sales were made at such prices they were simply premium sales, and do not correctly represent the gen-

eral market. There is no doubt that regular sales of soft billets have been made at as high as probably $60, and sheet bars at $70, but the average market is not so high. Output of steel is not over 80 per cent of normal, and with some plants is less, due largely to shortage of fuel.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $58 to $60; 2 x 2-in. billets at $65; slabs, $57 to $60; sheet bars, $60 to $65, and forging billets, $75 to $80 base, all f.o.b. mill Pittsburgh or Youngstown.

Structural Material.—Inquiry continues very active. The McClintic-Marshall Co. has taken an office building for the Broome Street Realty Co., New York, 1100 tons; warehouse and sheds for the Samson Motor Co., Janesville, Wis., 1200 tons, and 200 tons for a new building for the Sotter Brothers Boiler Works, Pottstown, Pa. The American Bridge Co. has taken 2300 tons for steel mill buildings at Cleveland, 3000 tons for factory buildings for a tire concern at Buffalo and 4000 tons for factory buildings at Long Island. The Jones & Laughlin Steel Co. has taken 500 tons for an open-hearth steel building for the Worth Steel Co. at Claymont, Del.; 700 tons for a building for the Lovell Mfg. Co., Erie, Pa., and 200 tons for an extension to the Diamond National Bank Building in this city. The Memphis Steel Co. has taken 700 tons for factory buildings for the New England Westinghouse Co., Springfield, Mass. Both local concerns making plain steel are reported sold up for practically the remainder of this year. Small lots of plain material for fairly prompt shipment are bringing 4c. to 5c. at mill. We quote plain material up to 15 in. from 2.45c., this being the price of the Carnegie Steel Co., to 2.70c. and up to 4c. for small lots for fairly prompt delivery.

Plates.—Reports are that shortly after the railroads go back to private ownership on March 1 the Pennsylvania Railroad and the New York Central will send out inquiries for a very large number of cars of all kinds, but the two local steel car companies say they have not had any inquiries as yet from these two roads. There is a very heavy demand for plates from all parts of the country and nearly all the mills are congested with business. Consumers are actively going after warehouse stocks for plates, being advised by mills that they cannot do anything for them. The shipyards have heavy inquiries out, one such reported inquiry being for 30,000 tons or more for last half delivery, and on which local mills refuse to quote, saying they could not possibly make delivery. There would likely be no trouble whatever in getting 4.50c. or higher for plates for fairly prompt delivery.

We quote sheared plates of tank quality, ¼ in. and heavier, at 2.65c. to 2.90c. for indefinite delivery, probably not before next year, while the active market prices of mills that will accept orders for delivery in three or four months range from 3.50c. to 4c. and higher at mill.

Sheets.—There is no betterment in the car supply, and very heavy stocks of finished sheets continue to be piled in warehouses of mills waiting for shipment. All kinds of premiums are being offered for sheets for prompt delivery, a sale of a considerable quantity of No. 28-gage black sheets being reported at 8c. at mill. Of course, this price is much above the general market and simply represents the distress of buyer to get sheets for a certain job that he did not want held up. Average operation of sheet mills is 75 to 80 per cent of normal capacity. There is a very wide range in prices, these depending entirely on whether the buyer is a regular customer of the mills and the delivery wanted.

We now quote No. 28 gage box annealed, one-pass black sheets at 4.35c. to 5.35c.; No. 28 galvanized, 5.75c. to 6.75c., and No. 10 blue annealed at 3.55c. to 4.50c., the lower price named being the March 21 schedules.

Tin Plate.—Very heavy stocks of tin plate are still being piled in warehouses of mills awaiting cars for shipment, and there is no relief in sight. The shortage in fuel and steel, also in cars, is holding down output of tin plate to a considerable extent, and it is very likely that a large tonnage scheduled for delivery in first half will not all be shipped out before third quarter. Some large consumers find they did not buy enough tin plate to meet their needs, their shipments are being delayed and they are scouring the market trying to find tin plate either at the mill warehouses or in stocks of jobbers. This condition is increasing the demand for wasters, which is very active. Export demand is fairly heavy, coming mostly from the Orient. It is claimed that tin plate for export has sold as high as $9.50 per base box at mill. We quote tin plate for domestic consumers and indefinite delivery at $7 per base box, wasters $7.50 to $8 and for export $9 to $9.50 per base, all f.o.b. Pittsburgh.

Wire Rods.—Demand continues very active, much larger than the available supply, and prices are very firm. One local maker reports having sold recently about 800 tons of soft rods at $65 at mill, and it is said $70 has been done. We quote soft Bessemer and open-hearth rods at $65 to $70 and high-carbon rods at $75 to $100 at mill.

Wire Products.—Elsewhere in this issue is given in full the new wire nail card recently sent out by the Pittsburgh Steel Co. and the Youngstown Sheet & Tube Co., which will also be sent out likely this week by several other independent mills. The average advance in prices on this new card is 22c., but the card is based on $4 per keg at mill for 20 to 60 penny, the advances being contained in the extras, in which some radical changes have been made. The demand for wire nails and wire of all kinds is very heavy, and stocks at mills and held by jobbers are very light. Heavy premium over what are regarded as regular prices are being offered for both nails and wire for early shipment. We now quote wire nails at $3.25, this being the base price of the American Steel & Wire Co. on its card, and $4 base on new card as noted above. Prices on wire products are given in detail on page 639.

Iron and Steel Bars.—All kinds of fancy prices are being offered for steel bars for prompt shipment, and it is said sales have been made at 5c. at mill and higher. There is an acute shortage in supply of steel bars, local mills being filled up on all they can make over the remainder of this year. Demand for iron bars is also heavy, two local mills now declining to quote for delivery in first half of this year.

We quote steel bars rolled from billets at 2.35c., this being price of the Carnegie Steel Co. for very indefinite delivery up to 4c. at mill. Prices depend entirely on who the buyer is and the delivery wanted. We quote common iron bars at 4c. to 4.50c., and refined iron bars at 4.25c. to 4.75c. in carloads f.o.b. mill, Pittsburgh.

Hot-Rolled Strip Steel.—Several local makers are not quoting for delivery for first half, being fully sold up to that period, while one or two others are accepting orders from customers who insist upon placing them, but only at prices in effect at the time shipments are made. The scarcity of steel and fuel is cutting down output to a considerable extent. It is said sales of hot-rolled strips have been made at 6c. base and higher. We quote hot-rolled strip at 5c. to 6c., but it would require a very nice order from a regular customer to be accepted at the lower price.

Cold-Rolled Strip Steel.—Makers report they are filled up over first half and are turning down orders nearly every day on which they cannot make delivery wanted. We quote cold-rolled strips at 7c. to 9c. per lb. at mill, the price depending entirely upon whether the customer is a regular buyer of the mills, and the delivery.

Cold-Rolled Steel Bars.—The demand is very heavy, but local makers are not accepting very many orders, being sold up for first half, and have entered some orders for third quarter delivery at prices in effect at the time shipment is made. To regular customers some makers still name 3.85c. for indefinite delivery, but up to 5c. and higher at mill has been paid by some consumers who are in distress for material and are willing to pay any price to get it.

Spikes.—The demand from the railroads for standard spikes has been very heavy for some time, and several local makers are filled up for first half and out of the market. It is said business in spikes now being figured on from the railroads totals nearly 100,000 kegs, with a good many roads yet to come in the market after they go back to private ownership. The demand for boat and barge spikes is also very active.

One local maker continues to quote $3.75 base for standard spikes.

We quote standard spikes, 9/16 x 4½ in., at $3.60 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅜ in. and 7/16 in., $4.25; 5/16 in., $5; boat and barge spikes, $4.25, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Nuts, Bolts and Rivets.—Local makers continue to report the demand very heavy and state they are filled up for practically first half, having recently entered orders for shipment in second quarter, prices to be those in effect at the time delivery is made. The demand for rivets is active, most makers now quoting $4.50 for structural and $4.60 for boiler rivets. Discounts on nuts and bolts are given in detail on page 639.

Hoops and Bands.—It is said bands for prompt delivery has sold up to 5c. at mill, and one local maker that has been quoting 4c. for some time is now quoting 4.50c. and will not shade that price. The Carnegie Steel Co. has not changed its one hoop and bands of 3.05c., but is said to have none to sell for delivery over this year. We quote hoops and bands at 4c. to 5c. at mill, prices depending on the order and the delivery wanted.

Boiler Tubes.—The demand for tubes for stationery boilers is reported by the mills to be very heavy, but for locomotive tubes is only fairly active. Makers of iron and steel tubes report they are sold up for first half and the leading interest is sold up for the remainder of this year on boiler tubes and also on seamless tubes. Discounts on iron and steel tubes are given on page 639.

Iron and Steel Pipe.—There is no abatement in the abnormal demand for iron and steel pipe and for oil well tubular goods, the mills being simply congested with business and turning down attractive orders every day on which they cannot quote and make the delivery wanted. The very high prices ruling for crude oil are a great incentive for development work, and are taken to mean that the heavy demand for oil well supplies of all kinds is likely to last for two or three years. Four or five of the leading makers of iron and steel pipe are not quoting on any offered business for this year delivery. Output is restricted on account of the scarcity of steel and fuel, and shipments are greatly held up on account of the scarcity of cars. Several makers who report operating at nearly normal capacity say their actual output is not over 75 to 80 per cent of what it should be, due in part to inefficiency of labor.

Coke.—The car situation in the coke regions is not any better, and last week there was such a great lack of motive power that at several large coke plants it took two or three days to get coke moved from the ovens in cars to the scales for weighing before being shipped. One leading coke operator that draws coke from 11 plants reports that his average car supply last week was only 35 per cent, and this is likely true of most other coke works. Coke is still moving very slowly to most of the blast furnaces, some of which have had a supply for only a day or two ahead. Some in the trade believe that shortly after the railroads go back to private ownership, the date being set for March 1, the Government will give up control of prices on coke and the market will be open. If this takes place, very material advances in prices of both spot and future furnace and foundry coke are likely. Output of coke last week was 243,986 tons, an increase over the previous week of about 4000 tons. This was not due to any betterment in the car supply, but to a more liberal use of individual cars. Government prices on coke are $6 for spot and future furnace coke and $7 for foundry in net tons at oven.

Iron and Steel Scrap.—The local scrap market is very dull in demand, none of the local consumers being in the market, and prices on some grades are weak and slightly lower. There is no rush on the part of dealers to try to force new business, and these who have fairly large stocks of scrap in their yards are willing to hold it for higher prices, believing the market may show a turn for the better in the near future. The railroads are expected to be heavy buyers of steel soon after they go back to private ownership, and scrap dealers figure that there will be an active demand for scrap when the railroads commence to place their orders with the steel mills for track equipment. We have revised prices, some to a lower basis, and now quote as follows for delivery in the Pittsburgh and other districts that take Pittsburgh freights.

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$27.00 to $27.50
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	34.00 to 35.00
Compressed steel	23.00 to 23.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh district	18.00 to 18.50
Bundled steel stamping	17.00 to 17.50
No. 1 busheling	24.00 to 25.00
Railroad grate bars	28.00 to 29.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	31.00 to 32.00
Railroad malleable	31.00 to 32.00
Iron car axles	38.00 to 39.00
Locomotive axles, steel	33.00 to 34.00
Steel car axles	31.00 to 32.00
Cast iron wheels	41.00 to 42.00
Rolled steel wheels	29.00 to 30.00
Machine-shop turnings	17.50 to 18.00
Sheet bar crop ends (at origin)	30.00 to 30.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	33.00 to 34.00
Cast iron borings	19.50 to 20.00
No. 1 railroad wrought	33.00 to 34.00

British Products Very Scarce

Blast Furnaces Short of Raw Materials—Ferromanganese and Iron Ore Higher

(*By Cable*)

LONDON, ENGLAND, Feb. 23.

The scarcity of pig iron is unrelieved, and domestic demands more than absorb all the output. Makers will not quote, pending an advance which is expected daily. Several furnaces are ready for relighting but raw material is unobtainable, and active furnaces are only kept going with difficulty. Export buyers are bidding in vain for anything they desire. The hematite iron market is tighter than ever. The best Rubio ore is quoted at 70s, ex-ship, Tees.

The ferromanganese market is stronger, with £50 asked for prompt export delivery and £45 for April-May.

The galvanized sheet market is strong, with £52 f.o.b. paid for June-July delivery. The market for thin gages is rampant with Eastern buyers clamoring for fairly early shipment. Japanese specifications have sold for £75 for June-July shipment. Black sheets, 107 lb., for Japan, have sold at £65 for June-July delivery. The tin-plate market is quiet but steady, with 14 x 18¾ sold at 74s for second half.

General conditions in the steel market are unchanged, with makers fully booked and in most cases refusing to quote. Japan is a heavy buyer of shipyard material.

Steel, Peech & Tozer, Ltd., have formed a company known as the United Strip & Bar Mills, with a capital of £2,000,000. John Summers & Sons, Ltd., has purchased the Shelton Iron, Steel & Coal Co.

We quote per gross ton, except when otherwise stated, f.o.b. makers' works, with American equivalents figured at $3.40 for £1, as follows:

	£	s.	d.	£	s.	d.	
Ship plates	23	10	0	to 26	10	0	$79.90 to $90.10
Boiler plates	27	10	0	to 30	0	0	93.50 to 102.00
Tees	21	10	0	to 27	0	0	73.10 to 91.80
Channels	20	15	0	to 26	5	0	70.55 to 89.25
Beams	20	10	0	to 25	0	0	69.70 to 85.00
Round bars, ¾ to 3 in.	23	0	0	to 27	10	0	78.20 to 93.50
Rails, 60 lb. and up	19	15	0	to 20	5	0	67.15 to 68.85
Billets	23	0					78.20
Steel hoops	31	15	0	to 32	0	0	107.95 to 108.80
Tin plates	0	70	0	to 0	74	0	11.90 to 12.58
Sheet and tin plate bars, Welsh	23	0	0	to 30	0	0	78.20 to 102.00
Galv. sheet, 24 g.	51	0	0	to 52	0	0	173.40 to 176.80
Cleveland basic iron	9	5	0				31.45
West Coast hematite	12	5	0				41.65
Cleveland No. 3 foundry (export)	11	10	0				39.10

The above prices are more or less nominal.

Philadelphia

PHILADELPHIA, Feb. 24.

Opinion is growing in the iron and steel trade that the peak of prices has about been reached. There are some who point to the possibility of higher prices for pig iron, but in steel an easier situation is looked for as soon as warmer spring weather has brought about an improvement in transportation, which will be quickly reflected in more satisfactory production. A step in the direction of easier conditions is the decision of an Eastern independent to open its books for second quarter contracts to regular customers in plates, shapes and bars. It is prepared to book from 100,000 to 200,000 tons of steel, perhaps more. Delivery in second quarter will not be absolutely guaranteed, but if production improves, as it should with the breaking up of winter, shipments will go forward in that period. Prices quoted are 4c., Pittsburgh, on plates, shapes and bars.

Conditions affecting production at Eastern mills are far from satisfactory, but they are better than a week ago, receipts of coal having been greater. Some plants whose open-hearth departments were running at a small percentage of normal have made a decided gain. Continued mild weather will do much to alleviate the situation. There is a feeling also that the railroads will function better under private ownership. Most of the present ills affecting steel production are directly traceable, as has been repeatedly pointed out, to transportation conditions. Embargoes still exist, New England being particularly affected, it being impossible to ship pig iron or steel to that section, and no scrap metal is coming out.

Railroads have begun to purchase steel. The Baltimore & Ohio, mentioned last week as being in the market for 5000 tons of plates for car repairs, has placed its order with an Eastern mill at 4c., Pittsburgh. The Pennsylvania Railroad is expected to close this week on 7000 tons of plates, 2000 tons of shapes and 1000 tons or more of bars. There is a disposition on the part of the steel companies to give preference to railroad business on the theory that without adequate railroad service business generally will suffer increased hardships. On prices, however, there seems to be little disposition to give the railroads any advantage. One road attempted to place orders for plates at 3.75c., but it is asserted that it will be obliged to pay 4c., Pittsburgh. Some business in plates at 3.75c. has been accepted, however, by one or two mills which can roll only narrow widths. An Eastern company has given notice to the Pennsylvania Railroad that its price for open-hearth rails, of which it recently accepted a tonnage on an open price basis, will be $57, mill. The independent makers are practically unanimous on this price, but the leading interest has quoted $47, mill.

Pig Iron.—A sale of 2000 tons of basic pig iron for second quarter delivery has been made at $42, furnace, an advance of $2 over the last reported transaction. The freight rate in this instance is $1.40, making a delivered price of $43.40. Another furnace, with a lower freight rate, has sold a small tonnage at $42.50, furnace. A large Eastern consumer informally inquired this week for its third quarter requirements, but did not place an order, presumably on the theory that prices are too high. An Eastern furnace has sold 3000 tons of Bessmer iron for export at $45, furnace, but a domestic sale of 500 tons of Bessemer from stock was made by another interest at $42, furnace. Sales of standard low phosphorus iron for second half have been made in the past week at $50, furnace. There is no great pressure for foundry iron for early delivery, due chiefly to the fact that the coke shortage has decreased the melt at many foundries. No. 2 X iron from eastern Pennsylvania furnace is still offered at $44.25, furnace, but some furnaces are endeavoring to obtain more. One furnace asks $45, furnace, for No. 2 X for second half, and another has sold upwards of 5000 tons of foundry iron for second half on the basis of $45, this applying to No. 2 plain, with usual differentials for higher percentages of silicon. Virginia iron for second quarter has sold in the past week at $42 base, furnace, with usual differentials. On about 1000 tons of high silicon iron, 3.25 to 3.75 per cent, the delivered price ran well over $50. An electrical manufacturing company came into the market a few days ago for about 3000 tons of foundry iron for second and third quarter delivery at its plant, Lynn, Mass.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Pa., No. 2X, 2.25 to 2.75 sil.	$45.35 to $46.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	44.10 to 45.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	46.10
Virginia No. 2X, 2.25 to 2.75 sil.	47.35
Basic deliv. Eastern Pa.	43.40
Gray forge	40.50 to 41.50
Standard low phos. (f.o.b. furnace)	50.00
Malleable	45.15
Copper bearing low phos. (f.o.b. furnace	47.00

Coke.—The shortage of coke has become very acute. Operations at many foundries have been curtailed. There has been some improvement in delivery of coke to blast furnaces, but many are still short of actual needs.

Ferroalloys.—Sales of carload lots of ferromanganese, 76 to 80 per cent, have been made at $200, delivered, while one sale at $225 is also reported. Practically nothing is being done here in spiegeleisen.

Semi-Finished Steel.—There are few transactions in semi-finished steel. Open hearth re-rolling billets are quoted by two interests at $60, Pittsburgh, though in the case of regular customers one mill has sold at $57.50. Forging billets are hard to get even at $70, the nominal price, and $80, Pittsburgh, has been obtained for small lots from stock.

Plates.—An Eastern mill has opened its books to regular customers for second quarter contracts, its price being 4c., Pittsburgh. Most of the other mills remain in the position they have maintained for some weeks of staying out of the market. Some exceptions are being made in the case of railroads, it having been decided that preference must be given the railroads to put them in shape to handle the traffic to better advantage. The Baltimore & Ohio Railroad has placed 5000 tons of plates with one mill at 4c., Pittsburgh. The Pennsylvania Railroad will probably buy 7000 tons of plates this week, and it is stated that it also will be obliged to pay 4c. One or two mills which can roll only narrow widths have taken some business at 3.75c., but 4c. is generally regarded as the market in the East, with some quotations as high as 4.25c. An Eastern mill has taken some small lots from regular customers at 3.50c., Pittsburgh, but it is turning down much more tonnage than it is accepting.

Structural Shapes.—One Eastern interest, which has opened its books for second quarter contracts to regular customers, will be in a position to book 50,000 to 75,000 tons. Its price is 4c., Pittsburgh. Other makers continue to stay out of the market, although besieged to accept orders. Another Eastern mill quotes 3c., Pittsburgh, but it is accepting very little business, with deferred delivery.

Bars.—A nominal price of 5c., Pittsburgh, is quoted by an Eastern maker of bars, but this is done with the idea of discouraging business. Another maker of bars has decided to sell for second quarter, one of its first orders being for 1000 tons, for which a jobber will pay 4c., Pittsburgh. With the exception of this mill practically none is accepting orders for bars for any delivery. Bar iron is in good demand, but some of the mills are able to make fairly prompt deliveries.

Sheets.—There are no new developments in sheets, the mills being sold up so far ahead that they are taking very little if any tonnage. Sheets for early delivery are almost impossible to get.

Rails and Track Supplies.—An Eastern mill, which agreed to take a portion of the 200,000 tons of rails tentatively ordered some weeks ago by the Pennsylvania Railroad, has notified that road that its price will be $57, mill. The business was accepted with the understanding that the price finally named was to be "mutually satisfactory." All of the independents now quote $57 for open-hearth rails, but the leading interest adheres to its price of $47. A Southern railroad is in

the market for 2000 kegs of railroad spikes. One mill has quoted 5c. per lb., Pittsburgh.

Bolts, Nuts and Rivets.—Advances recently announced by certain makers have now become general. New prices on boiler rivets and structural rivets are 4.60c. and 4.50c., base, respectively, f.o.b. Pittsburgh. Small rivets are 50 per cent off list.

Old Material.—While the local scrap market is quiet, a renewed demand has sprung up in the Pittsburgh district, a steel plant there having bought upwards of 15,000 tons of heavy melting steel at $29, delivered, of which 5000 tons were sold by a local broker. The tone of the market is much improved. A scarcity of scrap is predicted by dealers. The embargo on New England, it is held, will be a contributing factor, as it is expected that little, if any, scrap will come out of that section for the next 30 to 60 days. Car wheels are in demand and a minimum of $42.50 is now quoted. A weakness in cast scrap, which developed a week ago, has disappeared, and prices are up again at least $1. We quote for delivery in consumers' yards, eastern Pennsylvania, as follows:

No. 1 heavy melting steel	$25.00 to $26.00
Steel rails rerolling	35.00 to 36.00
No. 1 low phos., heavy, 0.04 and under	32.00 to 33.00
Car wheels	42.50 to 45.00
No. 1 railroad wrought	36.50 to 37.50
No. 1 yard wrought	30.00 to 32.00
No. 1 forge fire	21.00 to 22.00
Bundled skeleton	21.00 to 22.00
No. 1 busheling	24.00 to 25.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	19.00 to 20.00
Mixed borings and turnings (for blast furnace use)	19.00 to 20.00
Machine-shop turnings (for rolling mill and steel works use)	22.00 to 23.00
Heavy axle turnings (or equivalent)	23.00 to 24.00
Cast borings (for rolling mills)	24.00 to 25.00
Cast borings (for chemical plant)	28.00 to 30.00
No. 1 cast	46.00 to 41.00
Railroad grate bars	32.00 to 33.00
Stove plate	30.00 to 31.00
Railroad malleable	30.00 to 31.00
Wrought iron and soft steel pipes and tubes (new specifications)	25.00 to 26.00
Iron car axles	45.00 to 46.00
Steel car axles (f.a.s. New York for export)	39.00 to 40.00

New York

NEW YORK, Feb. 24.

Iron Ore.—The large number of reservations for iron ore made by some of the Eastern ore companies are being rapidly transformed into contracts under the new price of 14.1c. per unit, which compares with 12.54c., the price which prevailed for three years. Some sellers have not, however, come into the market and are pursuing a conservative policy as to prices and sales.

Pig Iron.—Considering the very large business done earlier in the month the continuation of the present dull period is expected. No marked buying movement is looked for until consumers who have been holding off for lower prices decide to jump in. A few foundries, whose business has been greater than anticipated when they placed their orders for the year, are now asking for additional iron. A valve manufacturer is asking for 1500 tons, a car equipment maker for 1200 tons, and another railroad equipment maker for 1000 tons of low phosphorus iron. A maker of electrical equipment, who apparently was not satisfied some time ago, is again inquiring for high silicon iron. Though practically no furnaces are advertising that they will sell iron, several will take on a small tonnage at higher than generally accepted prices. Prevailing prices for 1.75 to 2.25 silicon iron in this vicinity are about $42 for Virginia, $44 for eastern Pennsylvania, $45 for Buffalo iron, all at furnace, with the Government differentials effective. There is considerable demand for coke, many tons being shipped from Massachusetts to this district at as high as $12.55, oven, making the delivered price around $16.

We quote for delivery in New York, last half of the year, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$47.05 to $48.05
No. 2 X, sil. 2.25 to 2.75	46.05 to 47.05
No. 2 plain, sil. 1.75 to 2.25	44.80 to 45.80
No. 2 X, Virginia, sil. 2.25 to 2.75	46.40

Ferroalloys.—The ferromanganese market continues to gather strength. Alloy for spot delivery, for which the demand is becoming more insistent, and in some cases urgent, has sold in one case at $180 and in another at $200, delivered. At the latter figure a fair substantial tonnage changed hands. American producers have advanced their quotations for the last half to $170 for the third quarter, with deliveries for the last half unchanged at $160. Very little British alloy seems to be available either for the second quarter or the last half. In the last week around 2000 tons is reported as sold, the major portion at $150, seaboard, but several hundred tons at $165, seaboard. One British representative has a limited amount for delivery from August on for which $155 is asked and another representative might have more for sale upon the submission of inquiries by cable. It is understood that the foreign ferromanganese ore, reported a short time ago as being held at $1 per unit, can now be obtained at 80c. per unit. The spiegeleisen market is quiet but strong at $57 to $60, furnace, the latter figure being asked for nearby delivery, which quotations apply to the 20 per cent grade. For 50 per cent ferrosilicon, $80 to $85 per ton is asked. Demand is only moderate.

Finished Iron and Steel.—Chief interest lies in the scale of buying which will be adopted by the railroads on their return to private ownership and on the degree of success with which any admittedly urgent railroad orders find the steel available. All the roads have not yet covered for the rails regarded as necessary in the early future, and the late comers are facing the possibility of paying $57 per ton against the $47 at which most of the business was entered. Two railroads, at least, have paid the higher price, one on about 1700 tons of 85-lb. rails and the other on 1000 tons of 100-lb. rails. New car business offered includes 13,200 for the New York Central lines and 3200 for the Rock Island. Of the New York Central inquiry 4800 are steel hopper cars and 5600 all-steel box cars. The Great Northern order of 1000 ore cars was divided equally between the American Car & Foundry Co. and the Haskell & Barker Car Co. Increased desires are manifested by manufacturing consumers to secure third quarter protection, but such forward selling is still resisted. There is an intimation that slightly higher than the war level prices may obtain for this delivery on the part of the larger independent producers, such prices not merely being considered as necessary to take care of the higher raw material and haulage costs, but to absorb the recent increase in wages. Contracts for sizable structural steel projects awarded in the past week aggregate around 9000 tons. They include the following: American Bridge Co., 400 tons, for power station addition, Dayton Power & Light Co., Dayton, Ohio; Bethlehem Steel Co., 6100 tons for six city piers, Staten Island; Bethlehem Fabricators, 400 tons, Bowling Green building, Broadway; Hinkle Iron Co., 225 tons for laboratory and boiler house, New York University; the Jones & Laughlin Steel Co., 900 tons for the New York Central; Toledo Bridge & Crane Co., 200 tons for Lima Locomotive Works extension, Lima, Ohio, and an unnamed fabricator for 1000 tons for a Norfolk & Western bridge. It is rumored that arrangements are being made to go ahead with an addition to the Western Union building, New York.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.52c.; shapes, 2.72c. to 4.27c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the higher prices for the first, even the second quarter; bar iron, flats, wider than 6 in., 4.07c.; ⅝ and 7/16 in., round and square, 4.47c.; light rounds, squares and flats, 4.77c., and other sizes, 3.77c.

Cast-Iron Pipe.—Makers are very independent, accepting and rejecting orders at will. Orders continue to come in from gas and water companies, though there is but little municipal letting. One of the biggest orders of the latter class was that for the city of Boston on Feb. 25. We quote 6-in. and heavier at $70.30, New York; 4-in., $73.30, with $2 additional for Class A and gas pipe.

Old Material.—The market is a trifle softer and prices have been shaded on a few items. Inactivity is attributed to bad transportation conditions, lack of

fuel among users of scrap, sickness among plant employees and other factors cutting down the use of old material. We have marked down prices slightly on four items. Brokers and dealers are optimistic in regard to the not distant future. What might be termed freak sales have been made according to reports because of the necessity of plants to keep going at any cost. For instance, $38 is reported to have been paid for stove plate in this district and $45 for cast scrap.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$21.50 to $22.00
Rerolling rails	30.00 to 31.00
Relaying rails, nominal	48.00 to 50.00
Steel car axles	34.00 to 35.00
Iron car axles	43.50 to 44.00
No. 1 railroad wrought	33.00 to 34.00
Wrought iron track	24.50 to 25.00
Forge fire	18.00 to 18.50
No. 1 yard wrought, long	26.00 to 26.50
Light iron	10.00 to 11.00
Cast borings (clean)	19.50 to 20.00
Machine-shop turnings	17.00 to 17.50
Mixed borings and turnings	16.00 to 16.50
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	21.50 to 22.00
Stove plate	28.50 to 29.50
Locomotive grate bars	28.50 to 29.00
Malleable cast (railroad)	29.00 to 30.00
Old car wheels	39.00 to 40.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$41.00 to $42.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	38.00 to 39.00
No. 1 heavy cast, not cupola size	29.00 to 30.00
No. 2 cast (radiators, cast boilers, etc.)	29.00 to 30.00

Boston

BOSTON, Feb. 24.

Pig Iron.—The market is decidedly mixed. Some eastern Pennsylvania iron, third quarter delivery, has sold on a $45 furnace basis. A furnace offers No. 2 X third quarter, with a $3.10 freight, at $47.10 furnace. One foundry bought 1000 tons No. 1 X last half iron, at $48 furnace. A central Pennsylvania furnace offered another foundry 1000 tons No. 2 X, third quarter iron, with a $4.40 freight rate, at $47.10 furnace, but the buyer secured 400 tons from another furnace for less money. Central Pennsylvania iron, last half, is offered freely on a $41.50 base. Buffalo iron also is offered at materially lower prices, namely, $43 furnace, as compared with $45 a fortnight ago. Two of the largest Virginia companies are out of the market, but Virginia iron has sold at $43.25 for silicon 2.25 to 2.75 first and second hand, and at $45 furnace for silicon 2.75 to 3.25, same deliveries, or a $42 base. One Alabama company has advanced last half iron to $43 furnace base and first half to $42, but southerns irons are still available at $40. One New England furnace has advanced first half charcoal iron from $62.25 to $67, is still quoting last half at $71.75, and has booked some business at the former price. Richmond charcoal is quiet and unchanged at $65. Three cars of Lake charcoal sold at $57.50 furnace, delivery to be made as soon as possible. Sales of all kinds of iron during the past week have been comparatively small, being less than 10,000 tons. Delivered prices follow:

Eastern Pennsylvania silicon, 2.25 to 2.75	$46.90 to	$49.15
Eastern Pennsylvania silicon, 1.75 to 2.25	45.65 to	47.90
Buffalo silicon, 2.25 to 2.75	48.15 to	50.15
Buffalo silicon, 1.75 to 2.25	46.90 to	48.90
Virgina silicon, 2.25 to 2.75		47.95
Virginia silicon, 1.75 to 2.25		46.70
*Alabama silicon, 2.25 to 2.75	47.35 to	50.35
*Alabama silicon, 1.75 to 2.25	45.75 to	48.75

*Alongside Boston prices.

Coke.—The New England Coal & Coke Co. has established a delivered foundry coke contract price of $13.95 during the rest of 1920, and a spot delivered price of $14.95 where the freight rate does not exceed $2.40. Where the freight exceeds $2.40, the company's contract price is $11.55, f.o.b. ovens, and its spot price is $12.55.

Finished Iron and Steel.—The railroad embargo has forced some departments of mills to close, thereby making worse the New England iron and steel supply situation. Only dribbling lots from mills have been received this month, some over the Lehigh and New Haven, others by Lackawanna and Grand Trunk into Maine, and others via Boston & Albany to Springfield and points West. Wire interests are beginning to feel the pinch for material, as are others. Inquiries in the market include: 800 tons 1 1/16 to 2 1/16-in. shafting, Bessemer screw stock quality, Edgar T. Ward & Sons, Boston, iron and steel; 200 to 300 tons flats, rounds, angles, T's and channels, Wason Mfg. Co., Springfield, railway car builder; 600 tons plates and 200 tons ship sections with 30-day option on acceptance, Bath Iron Works, Bath, Me.; and a large tonnage of sheets, Weir Stove Co., Taunton, Mass. Local mill representatives are accepting little new business. One is asking a flat price of 4c., f.o.b. Pittsburgh, on plates, bars and shapes. Another is quoting 4½c., f.o.b. Pittsburgh, on plates, but taking no business. Usual prices on structural steel are 3c. to 3.50c., f.o.b. Pittsburgh, with quotations below and above this range. Quotations on bars take an equally wide range. The Phoenix Bridge Co. is awarded 300 tons structural for building No. 42 addition, Charlestown Navy Yard, Boston; Boston Structural Steel Co., Cambridge, 550 tons for Lowell, Mass., memorial building; Providence Steel & Iron Co., 400 tons for a Woonsocket mill. Stone & Webster are figuring on a steam power plant, St. Joseph Lead Co., Leadwood, Mo., 650 tons structural.

Warehouse Business.—Some warehouses have raised best iron rounds, 7/16-in. and smaller and thinner than ¼ in., from $6 to $7 per 100 lb. Small flat galvanized bars have advanced 3.30c. to 4.10c.; large flats, 1.90c.; small round, 2.30c., and large round, 0.90c. per pound. Structural rivets are 75c. per 100 lb. higher. Semi-finished nuts are now quoted 45 per cent discount; h.p. nuts are quoted list plus 2c., instead of list plus 1c., and 6 x ⅜ in. and smaller common carriage bolts at 15 per cent discount, and 6¼ x ⅜ in. and larger at 5 per cent discount. There has been a material advance in proof coil self-colored chain in casks, the smaller sizes taking the largest advance. Cap and set screws are 5 per cent higher, 40 per cent and 45 per cent respectively. Canadian wire nails are offered in carload lots at 7.35c., f.o.b. Boston base, and at 8.35c. base from Boston stock, by a Providence broker.

Old Material.—The old material market is more active in spots, with prices irregular. Heavy melting steel has eased off further and one dealer bought 1000 tons against contracts, paying less than $22. This same dealer paid $39.20 for 500 tons No. 1 machinery cast, f.o.b. Boston, however, which represents a material advance. Boston foundries are paying $1.85 per 100 lbs. for No. 1 cast at yards and hauling it away in trucks, and $1.65 for No. 1 and No. 2 mixed. One house reports a sale of malleable at $30 a net ton f.o.b. cars shipping point, but that price is extreme. Blast furnace borings and turnings are a shade higher, but not a real factor in the market. Otherwise prices are unchanged and largely nominal owing to the inability to move freight. Prices as quoted at the yards follow:

No. 1 heavy melting steel	$20.50 to $21.50
No. 1 railroad wrought	30.00 to 31.00
No. 1 yard wrought	24.00 to 25.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	20.50 to 21.50
Machine shop turnings	16.25 to 17.25
Cast iron borings	19.50 to 20.50
Heavy axle turnings	18.00 to 19.00
Blast furnace borings and turnings	15.00 to 16.00
Forged scrap	16.50 to 17.50
Bundled skeleton	16.50 to 17.50
Steel car axles	31.00 to 32.00
Car wheels	38.00 to 39.00
Machinery cast	38.50 to 39.50
No. 2 cast	36.50 to 37.50
Stove plate	26.00 to 27.00
Railroad malleable	28.00 to 29.00
Rerolling rails	29.00 to 30.00

The Miami Metals Co., which leases one of the blast furnaces of the Iroquois Iron Co., at South Chicago, for the production of ferromanganese, will terminate its contract about April 1, and discontinue making that alloy. The Iroquois Iron Co. is considering the continuance of the manufacture of ferromanganese after the Miami company's lease expires, but has not yet come to a definite decision.

Birmingham

BIRMINGHAM, ALA., Feb. 23.

Pig Iron.—Sales of no great tonnage, made rather in the way of "try-out" of the price rather than in regular course of business, have been made by Birmingham iron sellers at $42, second half delivery. The same interests, however, booked simultaneously for regular customers for first half at $40. It is understood that there was no especially cordial response to the $42 base and at the close of the week the prevailing Birmingham base remained at $40. One interest, which had previously sold some iron at $41 and $42, sold 1500 tons in carload to 300-ton lots to regular customers for first half and third quarter delivery at $40, and another interest, which has never departed from the $40 level since first announcing it, booked around 4000 tons in lots of 200 tons and up the past week. A large foundry interest, at the close of the week, announced itself as out of the market for the time being with last sales having been made at $40. Another large foundry interest had also booked considerable Middle Western business at $40. Disposition of the makers generally remains conservative, but there is an inclination to establish what remains of last half capacity on a level of $42. There is no doubt that the policy of the leading interest in an effort to prevent a runaway market has had its effect with the independents. They would not care to have this interest enter extensively into the foundry market with the large tonnage, which it could produce if it felt especially inclined to do so. Charcoal iron has advanced to around $55 with one Alabama stack in active operation. Car shortage still holds back production as well as shipments. The Woodward Iron Co. alone has two stacks that remain idle on that account.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$40.00
Basic	39.00
Charcoal	55.00

Cast Iron Pipe.—The new expected prices caused a number of consumers to close deals on the preceding basis. Asheville, N. C., which dickered for several months, has placed an order for 3500 tons of 16-in. with the United States Cast Iron Pipe & Foundry Co.; Monroe, La., is about to close for 2000 tons of the same size of water pipe. Sanitary shops are booked to capacity 60 days ahead with consumers anxious to cover as soon as permitted.

Coal and Coke.—Southern foundries are getting sufficient coke for current needs. The Alabama Co. is distributing its surplus of Semet-Solvay by-product to the foundry trade pending repair of its Gadsden stack. Coal output is slightly under normal owing to the influenza. Car shortage affects coke output.

Old Material.—The scrap market appears to remain indefinite without special cause. Local consumers are fairly well taken care of and there is a temporary lull, but prices remain firm and the undertone is sound.

We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$21.00 to $21.50
No. 1 heavy steel	20.00 to 20.50
Cast iron borings	11.00 to 11.50
Machine-shop turnings	11.00 to 11.50
Stove plate	24.00 to 24.50
No. 1 cast	30.00 to 31.00
Car wheels	30.00 to 31.00
Tramcar wheels	28.00 to 29.00
Steel axles	29.00 to 30.00
No. 1 wrought	21.00 to 21.50

Arthur G. McKee & Co., 2422 Euclid Avenue, Cleveland, have been awarded a contract for furnishing a 5-unit Kling-Weidlein dry gas cleaner for the blast furnace plant of the Appleby Iron Co., Ltd., Scunthorpe, Lincolnshire, England. The decision of the Appleby Iron Co. to install this equipment was reached after a thorough investigation by its representatives of gas cleaning equipment in the United States and England. This is the second Kling-Weidlein dry gas cleaner installation being provided by Arthur G. McKee & Co. for erection in England, and makes a total of 11 installations at present in operation or under construction.

Cleveland

CLEVELAND, Feb. 24.

Iron Ore.—There is still a fair volume of activity in the ore market, although the heavy buying is over. Two or three consumers in the Pittsburgh district are now negotiating for 500,000 tons or over and it is expected that this will be placed during the week. A portion of the requirements of the Virginia furnaces was placed last week, but some inquiries for Lake Superior ore are still pending from that district. Developments in the Lake freight situation indicate a possibility that shippers will be compelled to pay premium rates on considerable ore. When ore prices were advanced it was expected that Lake rates on ore would be advanced from 80c. to $1 a ton, and the shippers were to absorb this addition to the carrying charges. The Lake rate for ore has not yet been fixed although a large part of vessel capacity is under contract for whatever is established as the rate for the season. However, some vessel owners are holding back, apparently expecting that with the heavy demand for vessel tonnage for ore this season, together with the fact that the capacity of the Lake fleet has not been increased during the past few years, they will be able to get higher than the going rates later if they withhold their vessels for wild cargoes. This attitude of some of the vessel men has caused a tightness in the vessel situation at present, although shippers say that the vessel capacity is adequate. If vessel owners succeed in forcing rates up on wild cargoes, the additional cost above regular rates for shipping ore would probably be passed on to the consumer.

Ore sales in the East aggregate 3,000,000 tons, and are understood to represent 75 per cent of the requirements of Eastern furnaces outside of their consumption of Eastern ores. One Eastern interest will use 2,000,000 tons of Lake ore, taking 500,000 tons on long time contracts, in addition to its recent purchase of 1,500,000 tons.

We quote, delivered, lower Lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Coke.—The shortage of foundry coke is as acute as ever. Shipments from the Connellsville district are only 25 to 50 per cent of normal, and are being made almost entirely in open cars, as closed cars are not available. Many foundries are still piecing out their inadequate supplies by buying by-product egg coke, which they are mixing with the Connellsville coke. This costs them about $12 delivered. Some New England by-product coke has been sold for Cleveland delivery at a delivered price of about $18.

Pig Iron.—A few round lots of foundry iron were sold during the week, but the volume of inquiry was rather light. Steel-making iron is quiet. Most of the foundries have covered for much of their last half requirements and the buying movement for that delivery has subsided. A Michigan automobile company during the week purchased 15,000 to 16,000 tons of foundry for the last half, about 10,000 tons going to a Lake furnace and the remainder to a southern Ohio producer. A new inquiry came from a Michigan tractor company for 2000 to 3000 tons of foundry iron for the second and third quarter, and this business is understood to have been placed. The General Electric Co., which recently inquired for over 10,000 tons of iron for its Erie works, has placed 6000 tons, 3000 tons of foundry and 2000 tons of malleable going to a western Pennsylvania furnace for the third quarter delivery, and 1000 tons of foundry iron to a Cleveland furnace for the last half. One interest reports sales during the week amounting to 25,000 tons. One producer has advanced its price to $43 for 1.75 to 2.25 silicon foundry iron, but $42 is still being quoted for last half delivery. Small lot sales are being made at $45 for early delivery. Basic iron probably can still be had at $41 to $42 for the last half. One Alabama producer has advanced prices to $42 for 1.75 to 2.25 silicon iron for the first half and to $43 for the third quarter. For 2.25 to 2.75 silicon iron the quotations are $1.70 higher. Tennessee furnaces have withdrawn tempo-

rarily from the market. The shutting down of Jisco furnace has resulted in a shortage of silvery iron and considerable inquiry for silvery iron for early shipment. We note the sale of 900 tons of silvery iron for a northern Ohio consumer for the last half.

We quote delivered Cleveland as follows:

Basic	$40.40 to $43.40
Northern No. 2 foundry, sil. 1.75 to 2.25	43.40
Southern foundry, sil. 2.25 to 2.75	46.25 to 48.70
Gray forge	41.40
Ohio silvery, sil. 8 per cent	58.40
Standard low phos., Valley furnace	48.00 to 49.00

Finished Iron and Steel.—While there is still a good demand for finished steel, the volume of inquiry has fallen off somewhat. A tendency has developed among consumers to refrain from placing orders at top prices, and there is a belief that this may check further advances. Some consumers announce that they will take their chances with the market rather than buy for second quarter delivery at the present high prices. Mills generally are declining to take on additional tonnage until they catch up on deliveries. One western Pennsylvania mill this week resumed the entering of orders from its regular trade for steel bars which it is quoting at 4c. for 30 to 90 days delivery. The same interest is taking orders for plates and structural material at the same price. It also has opened its books for barbed wire, which it is quoting to jobbers at 4.60c. for galvanized and 3.90c. for painted. Inquiry for steel for railroad work is increasing. The Lima Locomotive Corporation has taken 30 locomotives for the Union Pacific Railroad and is figuring on 150 for the New York Central, the latter requiring 7500 tons of steel. The Cleveland Railway Co. has placed 1000 tons of rails with the Lackawanna Steel Co. In semi-finished steel we note the sale of 2500 tons of sheet bars at $70 for March shipment. Structural material is still very scarce for early shipment, and some orders are being placed with a Philadelphia warehouse at 4c. The Jones & Laughlin Steel Co. has taken 200 tons for a building for the Lovell Mfg. Co., Erie, Pa. Hard steel bars are now quoted at 4c. and higher. The demand for sheets continues heavy and a few are being offered. Blue annealed sheets for early shipment have sold as high as 7c., although some mills are quoting 5c. and 6c. A mill has quoted a Cleveland jobber 8c. for a round lot of black sheets. Other mills are quoting black sheets 7.25c. and 7.50c.

Old Material.—The scrap market is very dull and prices on several grades, including heavy melting steel, have further declined. Local mills are buying nothing and there is little activity among Valley consumers. Some sales of heavy steel have been made between local dealers at $26. Machine shop turnings are particularly weak. The only point at which there is a demand for this grade is at Brackenridge, where it is bringing $17.50 to $18 gross. A Detroit dealer reports the purchase of a round tonnage of turnings at the former price for Brackenridge delivery. The supply of scrap is plentiful except in cast, and some dealers look for a further decline in prices. The embargo against shipments to the McKinney Steel Co. is still in force, and a Warren consumer is not accepting shipments. Other Valley mills are taking material. There is no demand whatever at present for drop forge flashings and these are particularly weak.

We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$25.75 to $26.00
Steel rails, under 3 ft	29.00 to 30.00
Steel rails, rerolling	33.75 to 34.50
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap	30.00t o 31.00
Cast borings	18.50 to 19.00
Iron and steel turnings and drillings	15.75 to 16.00
Short turnings for blast furnaces	18.00 to 18.50
Compressed steel	22.50 to 23 00
Railroad wrought	29.00 to 30.00
Railroad malleable	32.00 to 32.50
Agricultural malleable	27.00 to 28.00
Steel axle turnings	23.00 to 24.00
Light bundled sheet scrap	18.00 to 18.50
No. 1 cast	40.00 to 41.00
No. 1 busheling	22.50 to 23.00
Drop forge flashings, over 10 in	20.00 to 20.50
Railroad grate bars	30.00 to 31.00
Stove plate	30.00 to 31.00

Rivets.—The leading local rivet manufacturer advanced prices last week to 4.50c. for structural rivets and 4.60c. for boiler rivets, and to 50 per cent off list for small rivets. These prices are only for immediate specifications. Deliveries are about three months behind.

Cincinnati

CINCINNATI, Feb. 24.

Pig Iron.—The pig-iron market is quiet, and sales generally range from carloads to lots of 500 tons. Much of the business being transacted here comes from other districts, more particularly from St. Louis and Michigan. Inquiry is not particularly heavy, though it is reported that a Michigan automobile manufacturer was in the market last week for about 20,000 tons. This is believed here to have been split up between Chicago and Toledo furnaces. A leading Southern producer, who had been booking some business for the first half at $40, Birmingham, for silicon 1.75 to 2.25, advanced its price on Thursday to $42 and made sales at this figure. Another large interest, which had been quoting $40 for the rest of the year, is understood to be out of the market for the present, but will likely come in again next week at $42 for the base grade. At least two Southern interests are still selling at the $40 base for prompt shipment, while two others are quoting $44. No sales at the higher figure are reported. Virginia iron is selling in this territory at $42 base, furnace. Southern Ohio furnaces are reported as being sold up for first half and one interest is now quoting $45, Ironton, for second half. Another interest which disposed of most of its first half make at around $43, furnace, is understood to have withdrawn from the market. Inquiry for malleable during the week was fairly active, mostly from agricultural implement makers. Quotations cover a wide range, one furnace in southern Ohio asking as high as $48.50 furnace, but this is taken here to mean that it is out of the market. Another interest is quoting $45. No sales of basic are reported in this territory and quotation is nominal. Big Stone Gap, Va., furnace, was blown in on foundry iron on Friday. Globe and Star, Jackson County silvery furnaces, will, it is reported, be blown in early in March.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$43.60 to $45.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	44.85 to 46.85
Ohio silvery, 8 per cent sil	56.80
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	44.80 to 46.80
Basic, Northern	41.80
Malleable	43.80 to 45.80

Coke.—The coke situation, which showed slight improvement recently, has become just as bad as ever, and a wild scramble for fuel is being indulged in. Foundrymen are worrying the ovens with requests to ship on contracts. Both furnace and foundry coke is very scarce, and melters are running on the ragged edge continually. Until this car shortage is relieved, dealers do not look for any great improvement. Some speculation is being indulged in as to what is to become of the Fuel Administration when the railroads are handed back to private ownership and the Railroad Administration ceases to function.

Finished Material.—Demand far exceeds the available supply of finished material, and jobbers are hard put to it to take care of their regular customers, without quoting on specifications being received from all parts of the country. Deliveries in sheets apparently show some improvement, as some jobbers report that they have been able to place orders on the books of some mills for 60 days' delivery. Mills in southern Ohio have not been affected to such a great extent by the car shortage as those in other parts, and consequently are able to keep their yards from being piled up. On pipe, structural, and bars, jobbers' stocks are at the lowest point in their history, but some improvement is expected with the coming of finer weather. Jobbers have quite given up quoting on finished materials, as they are being supplied by the mills on the basis of prices ruling at time of shipment. Among pending

contracts in which a quantity of structural steel will be needed is the Rollman & Sons' departmental store, and a new plant for the Davis Welding & Manufacturing Co.

Tool Steel.—The feature of the past week in local tool steel circles was the cut in prices on one brand of high speed steel of 15c. per lb., effective Wednesday last, made by one of the leading tool steel manufacturers of the country. This is reported to be in line with the policy of the company which is stated to be that of giving the trade the benefit of any reductions it may be able to make in the cost of production. The market for high speed steel is very quiet just at the moment, consumers apparently being willing to wait until conditions become a little more settled than they are at present, particularly with regard to foreign exchange, before stocking up with the more expensive brands.

Old Material.—The scrap market, in steel mill grades especially, is quiet. The curtailment of operations at some mills due to the heavy storms encountered during the past few weeks, combined with the difficulty of securing cars to ship material, has resulted in steel scrap piling up in dealers' yards pretty freely. Dealers, however, are very optimistic as to the future, pointing to the high price of pig iron as one of the best reasons why scrap should be in demand. While the demand for steel scrap has fallen off to some extent, cast is active, and prices are very firm. A sale of heavy melting steel to a Pittsburgh steel mill for June delivery is noted at $26.50 Cincinnati. The Ordnance Salvage Board has disposed of about 1500 tons of steel scrap located at Hamilton, Ohio, 700 tons charging box size, 80 per cent of which was forgings and 20 per cent castings, to the Muncie Machinery & Supply Co. for $26.25 per gross ton, and 820 tons of formed open hearth and nickel sheets to Joseph Joseph & Bros. Co. at an average price of $32.05.

	Per Gross Ton
Bundled sheet	$16.00 to $17.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	44.00 to 45.00
Rerolling steel rails	30.00 to 31.00
Heavy melting steel	22.00 to 23.00
Steel rails for melting	24.00 to 25.00
Car wheels	29.00 to 30.00
No. 1 railroad wrought	26.00 to 27.00
	Per Net Ton
Cast borings	$13.50 to $14.00
Steel turnings	12.00 to 12.50
Railroad cast	30.00 to 31.00
No. 1 machinery	33.00 to 34.00
Burnt scrap	20.00 to 21.00
Iron axles	29.50 to 30.00
Locomotive tires (smooth inside)	23.50 to 24.50
Pipes and flues	17.00 to 17.50
Malleable cast	23.00 to 23.50
Railroad tank and sheet	16.00 to 16.50

Buffalo

BUFFALO, Feb. 24.

Pig Iron.—The Buffalo district furnaces are now out of the market except to old customers, and it is estimated by conservative furnace men that there is only sufficient of this accommodation iron left to supply two or three fair-sized tonnages throughout the remainder of the year. They are careful to point out that consumers, even old customers, should not rely on their being able to supply their demands at their own convenience. About 13,000 tons of iron, all foundry grades, were disposed of by local furnaces during the past week, but this commitment places them close to the limit of their capacity. One furnaceman, for instance, who sold 5000 to 6000 tons of foundry grades, principally low silicon iron, states that he has possibly 10,000 tons of foundry left for the rest of the year. Another furnace which sold less than 1000 tons during the week is out of the market even for accommodation tonnages. Another furnace which sold 5000 to 6000 tons during the week has only a very little iron to give to the old customers over the rest of the year. All the iron sold last week was on the basis of $45 to $48. So acute is the shortage of iron that it is stated on reliable authority that if a furnace had iron on on which it could guarantee delivery within three months, $50 could be obtained for it, without regard to the silicon content. Most of the iron was sold for fourth quarter delivery, and there was no argument over the price. Several hundred tons of offgrade iron was also sold on the $45 base. Prices are remaining firm. One seller reports an inquiry for 6000 to 8000 tons of foundry. One furnace reports itself sold up heavier than at any time in its history. The situation is believed to be fundamentally strong and producers here look for a big year.

No. 1 foundry, 2.75 to 3.25 silicon	$48.00
No. 2X foundry, 2.25 to 2.75 silicon	46.25
No. 2 plain, 1.75 to 2.25 silicon	45.00
Basic	44.00
Malleable	42.25
Lake Superior charcoal	$58.00 to 60.00

Finished Iron and Steel.—Mills continue to labor under severe handicaps in the manufacture and shipment of finished material. There is a primary difficulty in obtaining shipments of raw material. One local mill here, unable to procure sufficient coal for its requirements, was compelled to resort to the use of oil. Coal shipments are still being held up, and there is difficulty obtaining supplies in addition to the poor shipping facilities. Complaint has been made that many shipments are being diverted to other points, which are in no greater need of them than local consumers. Material is being steadily piled throughout the district, owing to lack of cars to move it out, and because of a breakdown in switching facilities due to cold weather. There is a good volume of smaller-sized inquiry, but mills generally are out of the market. One local mill has been selling some small tonnages of plates and obtaining as high as 4c. for them, without any difficulty.

Warehouse Business.—The feature this week is the recent raise in prices of all commodities. Warehouse interests are now quoting as follows:

Steel bars, 4.06-4.11c.; iron bars, 4.76c.; shapes, 3.91-3.96c.; plates, 4.11-4.16c.; No. 10 blue annealed sheets, 5.46-5.51c.; No. 28 black sheets, 7.50c.; No. 28 galvanized sheets, 8.50c.; bands, 4.76-5.16c.; hoops, 5.96c.; cold rolled shafting, 5.50-6.00c.

Old Material.—There is a general improvement in the situation over last week, when scrap dealers and mills were tied up by car shortage and hampered by severe weather. There is still a grave shortage of cars, but dealers say they are easier to obtain this week, and shipments have been considerably facilitated. This has also been brought about by the lifting of several embargoes. Local mills are beginning to show an interest in the market and dealers are confident that a buying movement cannot be much longer delayed. A number of inquiries are beginning to come out with considerable interest developing in heavy melting steel. It is estimated that there is as high as 20,000-25,000 tons of inquiry for this grade. There is also a strengthening demand for stove plate and cast scrap of foundry grades. There is and has been for some time a considerable shortage of these grades. Mill stocks are believed to be dwindling and those who are looking for a rising market point to the fact that pig iron is being very strongly held, and that old material generally mirrors the trend of the market in pig iron.

We quote dealers' asking prices, per gross ton f.o.b., Buffalo, as follows:

Heavy melting steel, regular grades	$27.00 to $28.00
Low phos., 0.04 and under	32.00 to 33.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 machinery cast	38.00 to 39.00
Iron axles	40.00
Steel axles	40.00
Car wheels	37.00 to 38.00
Railroad malleable	31.00 to 32.00
Machine-shop turnings	17.50 to 18.00
Heavy axle turnings	21.00 to 22.00
Clean cast borings	20.00 to 21.00
Iron rail	30.00 to 31.00
Locomotive grate bars	24.00 to 25.00
Stove plate	30.00 to 31.50
Wrought pipe	20.00 to 21.00
No. 1 busheling	22.00 to 23.00
Bundled sheet stamping	19.00 to 20.00

The Hilles & Jones Co., Wilmington, Del., has now completed its purchases of new machine tools to replace worn and obsolete equipment in its machine shops. This new equipment comprises large and small planers, boring mill, turret and 20-in. engine lathes, saws, tempering furnaces, cranes and electric hoists.

St. Louis

ST. LOUIS, Feb. 23.

Pig Iron.—Melters of pig iron have continued to buy during the past week, the tonnages ranging about as they have for some time, the basic consumers staying out of the market because of supplies on hand or contracted for. The pressure for new supplies as well as for deliveries on existing contracts indicates that the foundries are using up their material and that the buying movement which has been on is due to real need of pig iron seen as a result of consumption and contracts for future deliveries of products. The prices asked are firmly at the figures quoted and furnaces are not showing any inclination to liberalize their terms in any way. The aggregate tonnage sold during the week was not as large as the preceding week, but a considerable number of inquiries remain unfilled.

Coke.—No coke transactions of consequence are being completed, the only purchases being of small quantities to fill immediate needs and very few of these because of the inability of oven representatives to make either spot or early future delivery.

Finished Iron and Steel.—In finished products there has been no change in the situation of the past several weeks. Mills do not want orders and representatives are still under instructions not to take new business. Specifications on contracts continue to be filled, but even in these the delivery situation is still troublesome and growing worse rather than better. Stock out of warehouse is still hard to get, as stocks are pretty well depleted and new supplies are not coming in at all freely.

For stock cut of warehouse we quote as follows: Soft steel bars, 3.94c.; iron bars, 4.59c.; structural material, 4.04c.; tank plates, 4.24c.; No. 10 blue annealed sheets, 5.59c.; No. 28 black sheets, cold rolled, one pass, 6.60c.; No. 28 galvanized black sheet gage, 8.10c.

Old Material.—The scrap market has no real stability, although the tendency is toward a firmer condition. Some business is being transacted, including some good sales against future needs to the American Car & Foundry Co. and the Helmbacher Rolling Mills. While the outlook is regarded as improving, there seems to be a disposition to await the final action on the Railroad bill by the President before making any extensive commitments. There is no quotable change in the items on the list, as transactions have not been sufficiently general to establish new figures.

We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$31.50 to $32.00
Old steel rails, rerolling	32.50 to 33.00
Old steel rails, less than 3 ft.	30.00 to 30.50
Relaying rails, standard sections, subject to inspection	45.00 to 50.00
Old car wheels	33.50 to 34.00
No. 1 railroad heavy melting steel	25.00 to 25.50
Heavy shoveling steel	22.50 to 23.00
Ordinary shoveling steel	22.00 to 22.50
Frogs, switches and guards, cut apart	26.00 to 26.50
Ordinary bundled sheets	16.00 to 16.50
Per Net Ton	
Heavy axle and tire turnings	19.00 to 19.50
Iron angle bars	28.00 to 28.50
Steel angle bars	23.00 to 23.50
Iron car axles	37.00 to 37.50
Steel car axles	35.00 to 35.50
Wrought arch bars and transoms	32.50 to 33.00
No. 1 railroad wrought	25.50 to 26.00
No. 2 railroad wrought	23.50 to 24.00
Railroad springs	23.00 to 23.50
Steel couplers and knuckles	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside	25.00 to 25.50
No. 1 dealers' forge	23.00 to 23.50
Cast iron borings	15.00 to 15.50
No. 1 busheling	23.00 to 23.50
No. 1 boiler, cut to sheets and rings	18.50 to 19.00
No. 1 railroad cast	35.50 to 36.00
Stove plate and light cast	30 50 to 31.00
Railroad malleable	26.50 to 27.00
Agricultural malleable	26.00 to 26.50
Pipes and flues	20.50 to 21.00
Heavy railroad sheet and tank	20.00 to 20.50
Railroad grate bars	29.50 to 30.00
Machine-shop turnings	15.50 to 16.00
Country mixed	22.50 to 23.00
Uncut railroad mixed	23.50 to 24.00
Horseshoes	24.00 to 24.50

The American-Belgian Chamber of Commerce has transferred its headquarters to 86 Rue de la Montagne, Brussels.

Chicago

CHICAGO, Feb. 24.

The best that can be said of the transportation situation is that it has grown no worse. Under present conditions, this is regarded as a favorable turn of events, and may account, in part, for improved operation by the leading interest. This company has been able to fire two of the blast furnaces which it had been forced to bank, and is now producing at the rate of 85 per cent of ingot capacity. The foremost independent is still on a 75 per cent basis.

Although the mills are now choked with orders, they are being pressed hard for steel to be used in car construction and repairs. The leading interest has undertaken to furnish 22,000 tons for this purpose, and inquiries for a total of about 25,000 tons for car repairs are current. Outside producers continue to sell in this market at attractive prices, an important Eastern mill having taken small tonnages of plates, shapes and bars for second and third quarter delivery at 4c., Pittsburgh.

Cast-iron pipe is in some instances commanding a premium of $4 to $5, and another general advance would not be surprising. The United States Cast Iron Pipe & Foundry Co. is low bidder on 20,000 tons for Chicago. Pig iron is strong, Southern Iron having advanced $2 a ton. Buying is in good volume, a Michigan automobile manufacturer having bought 20,000 tons of foundry and malleable and a large steel foundry 14,000 tons of basic.

Pig Iron.—A substantial volume of business is being closed, although inquiry is not as heavy as it was a week ago when the market was exceptionally active. A Michigan automobile manufacturer has closed for 20,000 tons of foundry and malleable for last half delivery at $42 and $43 base, Ohio furnace. A steel foundry melter has purchased about 14,000 tons of basic for second half delivery, at least a portion of which is reported to have been bought at $40, Valley furnace. Several other round tonnages have been sold in this territory, including 3000 tons of foundry and 1000 tons of silvery ordered by a Wisconsin consumer for last half delivery, 2000 tons of foundry for the same delivery and 2500 tons of foundry for shipment during the last three-quarters. The foundry bought by the Wisconsin melter was Southern iron, and was purchased at $42 base, Birmingham. Since this sale, however, one important Southern producer has withdrawn from the market and other makers have advanced their iron to $42. A large Southern interest which had been selling for first half only at $40, Birmingham, has opened its books for last half and is now selling for this year at the new price.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average, sil. 1.50 (other grades subject to usual differentials), delivered at Chicago	$57.50 to $60.50
Northern coke No. 1, sil. 2.25 to 2.75	45.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	43.00
Northern high phos. foundry	43.00
Southern coke No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	50.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	48.70
Southern foundry, sil. 1.75 to 2.25	47.00
Malleable, not over 2.25 sil	43 50
Basic	42.00
Low phos. (copper free)	50.00
Silvery, 7 per cent	$56.40 to 56.80

Ferroalloys.—As a result of satisfactory shipments, English ferromanganese is no longer a factor in the local market. A large consumer in this district has purchased a round tonnage of off material to take the place of foreign ferromanganese which failed to arrive. There does not seem to be any stable price for early shipment, as recent orders have been closed at from $185 to $200, delivered, and in exceptional cases at an even higher figure. Last half material is commanding from $160 to $175. The plant of the Chattanooga producer of ferrosilicon was recently damaged by fire.

We quote 76 to 80 per cent ferromanganese at $160 to $170 delivered; 50 per cent ferrosilicon at $90 delivered; spiegeleisen, 18 to 22 per cent, $60 furnace.

Railroad Rolling Stock.—It develops that the Great Northern bought 1000 instead of 750 ore cars, dividing the order equally between the American Car & Foundry Co. and the Haskell & Barker Car Co. The latter company has also received an order for 300 ore cars from the Soo Line. The Chicago, Rock Island & Pacific is inquiring for 3250 freight cars and 35 locomotives. The locomotive market has been particularly active. The Union Pacific has bought 102 engines, including 19 Mallet type, 27 Santa Fe type, 16 Mikado type, 10 Pacific type and 30 switchers. This order was divided between the three locomotive builders. The Louisville & Nashville has ordered 15 engines from the American Locomotive Co. and the Chicago, Milwaukee & St. Paul is in the market for 100 Mikado type locomotives.

Plates.—The pressing problem of the mills is how to supply the much needed steel for car construction and repairs. Much as producers wish to assist in the rehabilitation of the railroads, there is a limit to what they can do with their heavy bookings. For the time being, however, they are taking some tonnage for these purposes. The leading interest will supply 5500 tons of plates, shapes and bars to a local car builder for the repair of 1000 Pennsylvania freight cars. It will also supply 11,400 tons of steel, including 1400 tons of axles for the construction of 1000 ore cars for the Great Northern, and 4900 tons, including 700 tons of axles, for the construction of 500 box cars for the Soo Line. Inquiries for plates, shapes and bars for car repair work aggregate about 25,000 tons. One of the larger Eastern mills has recently taken limited tonnages of plates for second and third quarter delivery at 4c., Pittsburgh. These orders, however, have been confined to old customers with pressing needs.

Mill quotation is 2.65c. to 4.00c. Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.17c. for plates out of stock.

Structural Material.—The leading independent which has been taking some business of late in heavy structurals will accept no further orders except on approval of the executive offices. The foremost interest, despite exceptionally heavy bookings, is making every effort to assist old customers badly in need of material. A large Eastern maker has recently taken small lots for second and third quarter shipment at 4c., Pittsburgh. Fabricators continue to enjoy a flourishing business.

The mill quotation is 2.45c. to 4.00c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.97c. for materials out of warehouse.

Recent fabricating awards include:

The Milwaukee Electric Railway & Light Co., Milwaukee, steam generating plant, 1500 tons, to Northwestern Bridge & Iron Co.

Kewaunee Boiler Co., Kewaunee, Ill., series of plant extensions, 1100 tons, to Worden-Allen Co.

Commercial Union Assurance Co., San Francisco, office building, 1400 tons, to Pacific Rolling Mill Co.

Semet-Solvay Co., by-product plant, Rochester, N. Y., 1000 tons, to Lackawanna Bridge Co.

Steel & Tube Co. of America, additions to machine shop and billet mill, and yard crane runway, Indiana Harbor, Ind., 800 tons, to Worden-Allen Co.

Lunkenheimer Co., Cincinnati, foundry building, 800 tons, to International Steel & Iron Co.

Buick Motor Co., four plant structures, Flint, Mich., 700 tons, to International Steel & Iron Co.

Pickands, Mather & Co., head frame and washing plant, Hibbing, Minn., 450 tons, to Worden-Allen Co.

Majestic Theater building, Dallas Tex., 314 tons, to Austin Bros.

Willys-Overland Co., building, St. Paul, Minn., 211 tons, to Minneapolis Steel & Machinery Co.

Gisholt Machine Co., Madison, Wis., gray iron foundry addition, 200 tons, to Worden-Allen Co.

U. S. R. R. Administration, Illinois Central R. R., structural steel and rivets, Center Grove, Iowa, 198 tons, to American Bridge Co.

Interstate Iron & Steel Co., billet yard crane housing, South Chicago, 175 tons, to Lackawanna Bridge Co.

Polar Wave Ice & Fuel Co., ice house, St. Louis, 128 tons, to Missouri Bridge & Iron Co.

Oneida Motor Truck Co., Green Bay, Wis., machine shop addition and assembling floor, 75 tons, to Wisconsin Bridge & Iron Co.

French Battery & Carbon Co., Madison, Wis., factory addition, 75 tons, to Worden-Allen Co.

Wisconsin Food Products Co., Milwaukee, power plant and box factory, 600 tons of reinforcing bars, to Corrugated Bar Co.

The Boston Store, Milwaukee, additions, 400 tons of reinforcing bars, to Corrugated Bar Co.

Current inquiries for fabricated material include:

Northern Pacific Railroad, bridges, 1500 tons.

Swift & Co., fertilizer building, Norfolk, Va., 900 tons.

Hurrican & Gulch Railroad, bridge, Alaska, 1200 tons.

Samson Tractor Co., Janesville, Wis., warehouse and railroad shed, 800 tons.

Donaldson Building, Minneapolis, 1800 tons, bids asked by Graham, Anderson, Probst & White, Chicago.

Addition to Bullock department store, Los Angeles, 1000 tons.

Bars.—An important Eastern mill recently took limited tonnages of mild steel bars to accommodate old customers at 4c. for second and third quarter. Bar iron is still moving in moderate amounts, but rail carbon mills are practically out of the market.

Mill prices are: Mild steel bars, 2.35c. to 4.25c., Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.50c. to 3.75c., Chicago; rail carbon, 3.25c. to 3.50c., mill. Jobbers quote 3.87c. for steel bars out of warehouse.

Sheets.—The local mills are still out of the market, and outside makers have little to offer. Whereas, it was thought some time ago that a number of mills would be able to take second quarter tonnage, it is now believed that this will not be the case, as so much business has been taken quietly at extremely attractive prices. The production of sheets in this country in 1919 totalled 4,369,000 tons, of which about 10 per cent was exported. Canada and Japan having been the largest foreign buyers.

Mill quotations are: 4.35c. to 5.35c. for No. 28 black; 3.55c. to 4.50c. for No. 10 blue annealed, and 5.75c. to 6.75c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. The lowest prices are those of March 21.

Jobbers quote, Chicago delivery out of stock: No. 10 blue annealed, 5.52c.; No. 28 black, 6.50c.; No. 28 galvanized, 8.00c.

Old Material.—With a few exceptions, scrap prices have continued to decline. The downward trend has been encouraged no doubt by the inactivity of consumers and the efforts of some of the more timid sellers to dispose of their stocks. While the feeling of the market still reflects the uncertainty in Wall Street, it has been more directly affected by the curtailment of buying by mills and foundries. Shortage of unskilled labor to handle scrap shipments is limiting local consumption, while the scarcity of cars and numerous embargoes impede shipments to other markets. The general opinion of the trade is that the current weakness in old material is of temporary duration and that prices will recover their former strength if they do not advance to an even higher level. Railroad lists are light, the only important offering being about 6000 tons advertised by the Burlington.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$33.00 to $34.00
Relaying rails	40.00 to 50.00
Car wheels	34.50 to 35.00
Steel rails, rerolling	32.00 to 33.00
Steel rails, less than 3 ft.	28.00 to 28.50
Heavy melting steel	24.00 to 24.50
Frogs, switches and guards, cut apart	24.00 to 24.50
Shoveling steel	23.50 to 24.00
Low phos. heavy melting steel	28.00 to 29.00
	Per Net Ton
Iron angles and splice bars	$30.00 to $31.00
Steel angle bars	24.00 to 24.50
Iron arch bars and transoms	30.50 to 31.50
Iron car axles	39.00 to 40.00
Steel car axles	30.00 to 31.00
No. 1 busheling	21.00 to 21.50
No. 2 busheling	14.50 to 15.00
Cut forge	23.50 to 24.00
Pipes and flues	19.50 to 20.00
No. 1 railroad wrought	26.00 to 27.00
No. 2 railroad wrought	23.50 to 24.00
Steel knuckles and couplers	26.50 to 27.00
Coil springs	28.50 to 29.00
No. 1 cast	37.00 to 37.50
Boiler punchings	24.00 to 24.50
Locomotive tires, smooth	25.00 to 25.50
Machine shop turnings	13.50 to 14.00
Cast borings	13.50 to 14.50
Stove plate	31.50 to 32.00
Grate bars	30.50 to 31.00
Brake shoes	26.00 to 26.50
Railroad malleable	28.00 to 29.00
Agricultural malleable	28.00 to 29.00
Country mixed	17.00 to 18.00

Conditions at the Steelton plant of the Bethlehem Steel Co., which has been compelled to reduce operations by reason of a coal shortage, are gradually becoming better. The blast furnaces are again in operation and the early resumption of full operation is expected.

FOR RUSSIAN TRADE

Manufacturers Who Favor Dealing With the Soviet Government Organize

To promote trade with the Russian Soviet Government by working for the removal of present restrictions and providing commercial information to its members is the purpose of the American Commercial Association, 396 Broadway, New York. The association, which is non-political, consists of about 100 firms interested both in buying and selling in Russia, who met and organized Feb. 2, in New York. The membership includes companies dealing in iron, steel, machine tools, agricultural machinery, scales and valves, besides a number of exporters and engineers. Several of these firms have large contracts from the Soviet Government and are only awaiting the reopening of Russian trade to ship. A committee has been appointed to arrange a conference with the Secretary of State to urge reopening trade with Russia, immediate issuance of export licenses, and facilities for shipments of Russian gold for deposit against purchases.

In explaining the association and its object, the secretary, Harold Kellock, pointed out that in England there are two organizations of this type: the Anglo-Russian Trust and the Central Russian Institute, and that the British are carrying on considerable trade with the Soviet Government. Russians in the United States, who are closely affiliated with the Soviet Government, have informed the organizers of the association that their Government in making purchases looks with favor upon manufacturers who are combined, the Soviet providing a similar kind of purchasing and selling unit. These men have also explained that their Government believes that manufacturers so combined will prove more responsible and will be able to guarantee that goods are not the products of child labor or convict labor.

Among the exporters and firms dealing in iron, steel and machinery who are members and were represented at the organization meeting are: The Bobroff Foreign Trading & Engineering Co., Milwaukee, foreign representative for the Kempsmith Mfg. Co.; Milwaukee Shaper Co.; Richards Machine Co.; Lutter & Gies Co.; Luther Grinder Co.; Warren Tool & Forge Co.; Universal Machine Co.; Conneaut Shovel Co.; Steel Sole Shoe Co., and Phoenix Mfg. Co. Other members are the Foreign Products Co., New York Interstate Mechanical Laboratories, New York; Kenny Warehouse & Transportation Co., New York; Lehigh Machine Co., Lehighton, Pa.; Meyer Scale Co., Newark, N. J.; Tool & Machine Co., Boston; United Hardware & Tool Manufacturers of America, New York; United States Steamship Corporation, New York; Vulcan Iron Works, Jersey City, N. J.; Oriental Trading Co. of America, New York; Burch Plow Works Co., Crestline, Ohio; Acme Export & Import Co., New York; Fairbanks Co., New York; Simmons & Davis, consulting engineers, Milwaukee; American Foreign Trade Corporation, New York.

Warned Against the Soviet Government

After consideration of the question of trade with Russia, the Board of Directors of the American Manufacturers' Export Association, New York, has passed resolutions warning its members to exercise great caution in the impending trade relations with the Soviet Government. These resolutions, however, point out that the members of the association are desirous of resuming commercial intercourse with the Russian people when they are under a form of government of their own selection. Following are the resolutions passed:

WHEREAS, There are many exaggerated reports in regard to the amount of trading transactions which can be carried on between Russia and the outside world,

AND WHEREAS, Under any circumstances due to the breakdown of the Russian transportation system there can be only a relatively small amount of business transactions on the basis of an exchange of raw materials for manufactured goods,

AND WHEREAS, In view of the published statement of the so-called Soviet Government in Russia, it is evident that trade with Russia is practically impossible, except under the direct supervision and control of this Government,

BE IT RESOLVED, That the American Manufacturers' Export Association warns its members and other manufacturers to exercise the greatest care and caution against impending trade relations with Russia under the present Soviet Government,

AND BE IT FURTHER RESOLVED, That the members of the American Manufacturers' Export Association are eager and desirous of resuming commercial intercourse with Russia and the Russian people when that country is under some form of government of its own selection which has been chosen by a properly elected assembly.

EXPORT SITUATION

Poor Cable Service to Orient and Changeable Prices an Obstacle

The export business in iron and steel is almost at a standstill with most exporters. The chief hindrance is inability to obtain quotations from the mills and the continual rise in prices, which coupled with the poor cable service to the Orient makes exporters' quotations practically worthless. Although the Japanese are well supplied with all kinds of semi-finished material, they continue the heaviest purchasers. One exporter has an order for 1000 tons of ship plates from Japan, which he is unable to place. Inquiries from China are not numerous as Japan continues to resell into the Oriental markets.

Business of most exporters with South American countries is light. Despite the adverse exchange, some business is being done with France, which is rebuilding her merchant marine. Some 43 cargo boats and two passenger liners are under construction and a large number ordered in French shipbuilding yards. This has resulted in one export firm recently selling for shipment to France, 40 steam winches and 20 windlasses, besides about 15,000 tons of ship plates, already reported in these columns. This concern also has an order for about 900,000 lb. of heavy chain and will shortly close for 12 complete ship steering gears, all for French buyers. Belgian orders, which have been fair despite the exchange rate and high prices, have dropped off considerably, owing to inability of exporters to wire stable quotations and poor deliveries. One exporter who recently sold several large shipments of spiegeleisen to Belgium and Holland, has done practically no business since he was forced to quote 20 per cent spiegeleisen at $66, delivered at Antwerp.

Export Notes

A representative of Victor E. Karminski & Co., New York, who is traveling through the Near East, reports a need for flat sheets in Singapore. Writing from Weltervreden, Dutch East Indies, he says: "There is one thing I particularly want to call to your attention, that is the crying need for sheets in Singapore. Both corrugated and plain sheets are needed, but they seem to have much more of the corrugated. Every day one may see natives hammering corrugated sheets flat for use in the tinners' shops."

Consul Theodore Jaeckel, Bordeaux, France, has cabled that samples for exhibition at the Bordeaux Fair will be admitted by the French customs free of duty. Embargoes against exportation will not apply to these samples.

A foreign trade department has been formed in the United States Chamber of Commerce as a first step toward reorganizing the chamber along lines of great divisions of industry. The department will be headed by Chauncey D. Snow, who has resigned as commercial attaché at Paris.

The sale has just been completed of the Northern Iron & Steel Co.'s plant at Collingwood, Ont., to steel interests from the United States, represented in the negotiations by M. J. Shaw of Toronto, Ont., and R. J. Courtney of Buffalo. The price paid is said to be $200,000. The plant will be continued as an active concern.

NEW WIRE NAIL CARD

Old Price Declared to be Too Low Owing to Heavy Advance in Manufacturing Costs

Late last week the Pittsburgh Steel Co., Union Arcade, Pittsburgh, and the Youngstown Sheet & Tube Co., Youngstown, Ohio, issued new wire nail cards, in which radical changes have been made in extras, the cards being identical. The Jones & Laughlin Steel Co., Pittsburgh, and the Cambria Steel Co., Johnstown, Pa., have new cards under way which will be ready for the trade this week. The Pittsburgh Steel Co., in sending out the new wire nail card to its trade, also sent a letter giving the reason why the new card was necessary. These reasons in part are as follows:

The old card of extras was adopted in December, 1896, a time of depression, when costs of material and labor were extremely low, and prices for all steel products were at the lowest levels known. The necessity for a new card of extras on wire nails has been apparent for many years. Efforts to revise the card have been made from time to time for 10 years or more. Since September, 1917, when the Government fixed the base price at $3.50 per keg, our wire nail business has been done at an actual loss, and the smaller the nail the greater has been the loss, for the old card of extras did not compensate the manufacturer for the increase in cost over base.

The new card of extras follows the cost of manufacture as closely as possible, and the large nails do not, as they have in the past, carry the burden of the losses on small sizes. These adjustments will better the condition of the wire nail industry, making for a more free play of competition, an equitable arrangement of prices for varying sizes based upon costs of production, and eventually will result in a lower base price than would otherwise be possible.

The products of agriculture, mining and manufacture, largely depend upon wire nails, for packing and distribution for ultimate consumption. Building is impossible without nails. Normally the wire nail industry consumes 1,000,000 tons of steel annually. To meet the needs of the people, it is estimated that 20,000,000 kegs of nails are required this year. This production will not be attained unless there is a full supply of steel and prices are on a level that will yield fair and reasonable profits, so that there will be an incentive to devote steel to the production of wire nails.

The new card of extras on wire nails is effective on all new quotations and orders and upon such orders or contracts as have been accepted subject to our prices ruling at time of shipment. Orders and contracts upon our books prior to Feb. 16, 1920, taken at fixed prices will be subject to the old card of extras.

WIRE NAILS

Advances Per 100 Lbs. Over Base

	Common	Brads	Flooring	Casing
2d	$1.45	$1.50	....	$1.70
3d	1.15	1.20	....	1.35
4d	.80	.85	....	1.10
5d	.75	.80	....	1.05
6d	.60	.65	$.55	.75
7d	.55	.60	.50	.70
8d	.30	.35	.35	.50
9d	.30	.35	.35	.50
10d	.20	.25	.25	.35
12d	.15	.20	.20	.30
16d	.10	.15	.15	.20
20d	Base	.05	.05	.10
30d	"	.05	....	.10
40d	"	.05	....	.10
50d	"	.05	....	....
60d	"	.05	....	....

	Fence	Smooth Box and Siding	Barbed Box	Slating
2d	....	$1.65	$1.90	$1.20
3d	....	1.30	1.55	.95
4d	....	1.05	1.30	.85
5d	$.50	1.00	1.25	.75
6d	.45	.70	.95	.65
7d	.35	.65	.90	....
8d	.25	.45	.70	....
9d	.25	.45	.70	....
10d	.20	.30	.55	....
12d	.10	.25	.50	....
16d	.05	.15	.40	....
20d	Base	.05	.30	....
30d	....	.05	.30	....
40d	....	.05	.30	....

	Boat, Light (not annealed)	Boat, Heavy (not annealed)	Shingle	Finish
2d	....	....	....	$2.00
3d	....	....	$1.15 (No.14)	1.55
3d	....	....	.90 (No.13)	....
3½d	....	....	.75	....
4d	$1.25	$1.20	.70	$1.25
5d	....	....	.65	1.20
6d	1.15	1.10	.60	1.00
7d	....	....	....	.70
8d	1.00	.95	....	.60
9d	....	....	....	.60
10d	.90	.90	....	.45
12d	.85	.85	....	.40
16d	.80	.80	....	.25
20d	.75	.75	....	.15

SPIKES

Flat Head—Diamond Point

10d	$.15
12d	.10
16d	.05
20d	Base
30d	"
40d	"
50d	"
60d	"
7"	"
8"	"
9"	"
10"	.15
12"	.15

Oval Heads, $.15 per 100 lbs.
Chisel Points, $.15 per 100 lbs.

Large Head, Barbed Roofing Nails

	8 gage ½"heads	9 gage ½"heads	9½ gage ½"heads	10 gage 7/16"heads
¾"	$1.25	$1.25	$1.30	$1.30
⅞"	1.10	1.10	1.15	1.15
1"	1.00	1.00	1.05	1.05
1¼"	.90	.90	.95	.95
1¼"	.85	.85	.90	.90
1½"	.75	.75	.80	.80
1¾"	.70	.70	.75	.75

Plaster Board Nails

	8 gage ½"heads	9 gage ½"heads	10 gage ½"heads	11 gage 7/16"hds.
1"	$1.25	$1.25	$1.30	$1.35
1¼"	1.10	1.10	1.15	1.20
1½"	1.00	1.00	1.05	1.10

WIRE NAILS

	Hinge (not annealed) Countersunk or Oval Heads, Chisel or Diamond Points. Heavy	Light	Clinch (Oval Heads) (Not Annealed)	Fine
2d, ex. fine	....	....	....	$1.95
3d, ex. fine	....	....	....	1.55
2d	....	....	$1.55	1.95
3d	....	....	1.15	1.35
4d	$.95	$1.00	.95	1.05
5d	....	....	.80	....
6d	.85	.90	.75	....
7d	....	....	.70	....
8d	.70	.75	.55	....
9d	....	....	.55	....
10d	.65	.65	.45	....
12d	.60	.60	.40	....
16d	.55	.55	.35	....
20d	.50	.50	.30	....

	Barbed Car Heavy Bright (Not Annealed)	Barbed Car Light Bright (Not Annealed)
4d	$.80	$.95
5d	.70	.75
6d	.65	.70
7d	.60	.60
8d	.50	.50
9d	.50	.50
10d	.45	.45
12d	.35	.40
16d	.30	.35
20d	.25	.25
30d	.25	.25
40d	.25	.25
50d	.25	.25
60d	.25	.25

	Barrel	Barbed Roofing	Barbed Berry Box 16 gage	Barbed Berry Box 17 gage	Barbed Dowel Pins No. 8 gage
⅝"	$1.90	$1.55	$2.15	$2.45	$1.50
⅞"	1.55	1.30	2.00	2.30	1.35
1"	1.45	1.20	1.90	2.20	1.25
1¼"	1.35	1.10	1.80	2.10	1.15
1¼"	1.15	.95	1.75	2.05	1.10
1⅜"	.85	.90			1.05
1½"	.80	.80	Smooth Berry Box		1.00
1¾"	....	.75	Nails—Deduct $.25		....
2"	....	.65	per 100 pounds.		....

Smooth Foundry Nails

	8 gage ½"heads	9 gage ½"heads	10 gage ½"heads	11 gage 7/16"heads
¾"	$1.25	$1.25	$1.30	$1.35
⅞"	1.10	1.10	1.15	1.20
1"	1.00	1.00	1.05	1.10
1¼"	.90	.90	.95	1.00
1¼"	.85	.85	.90	.95
1½"	.75	.75	.80	.85
1¾"	.70	.70	.75	.80
2"	.65	.65	.70	.75
2¼"	.60	.60	.65	.70
2½"	.50	.50	.55	.60
2¾"	.50	.50	.55	.60
3"	.45	.45	.50	.55
3½"	.40	.40	.45	.50
3½"	.35	.35	.40	.45
4" and longer	.30	.30	.35	.40

Additional Extras	Per 100 lbs.
Annealed	$.25
Blued	.50
Barbed	.25

Extras for galvanized wire nails will be quoted upon application.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper New York		Tin, New	Lead		Zinc	
Feb.	Lake	Electrolytic	York	New York	St. Louis	New York	St. Louis
18	19.25	19.00	60.25	8.75	8.50	9.15	8.80
19	19.25	19.00	61.25	8.87½	8.62½	9.20	8.85
20	19.25	19.00	62.50	8.87½	8.62½	9.25	8.90
21	19.25	19.00	....	9.00	8.75	9.35	9.00
24	19.25	19.00	64.00	9.00	8.75	9.35	9.00

NEW YORK, Feb. 24.

Several of the markets are more active and higher. Demand for copper is only slightly improved but prices are unchanged and firm. The tin market has been inactive but values have risen decidedly, due largely to the exchange situation. Demand for lead is again increasing and prices are advancing. There has been a moderate amount of buying of zinc, both foreign and domestic, and quotations are higher. Antimony is unchanged.

New York

Copper.—The market continues dull but it is firmer. Demand is a little better but it is only relatively so and the amounts involved are small. There has been a little buying for domestic account for delivery into the second quarter, and it is stated there is not only a better inquiry for export but that conditions in this direction are improved. The larger producers are quoting electrolytic copper unchanged at 19c. for first quarter and 19.25c. for second, with Lake at 19.25c. for early delivery with about 19.50c. quoted for second quarter. Now and then small quantities of electrolytic copper are obtainable in what is termed generally the outside market at slight concessions under these levels, but this phase of the situation is not considered important.

Tin.—The feature of this market is the advance in London of tin to the highest levels ever known. To-day spot Straits was quoted at £415 10s. with futures at £418 per ton. A week ago spot Straits was quoted at £392 per ton. Just whether these high levels are due entirely to speculation or to American buying, or both, it is difficult to state, but it is a fact that, with the London market lower than the Singapore market, buying in London would predominate. On this side the market has been quiet and a fair business has been done among dealers, with consumers largely absent. The market has lacked the usual snap. Prices of spot Straits have advanced decidedly, due partly to the improvement in the pound sterling and partly to less desire on the part of larger interests to sell. It is evident that the statistical position of the local market is growing stronger all the time for the metal is evidently passing into stronger hands, as noted a week ago. For the first time in many months there was a little activity on the New York Metal Exchange last Friday when actual sales of tin were made. Spot Straits to-day is quoted at 64c., New York, with futures at about 65.50c. Arrivals so far this month have been 3095 tons, with the quantity afloat quoted as 4870 tons.

Lead.—To-day the American Smelting & Refining Co. again advanced its quotation ¼c. to 9c., New York, or 8.75c., St. Louis, the outside market having practically reached this level the latter part of last week. The demand for the metal is very strong, and there are several substantial inquiries in the market to-day. It is expected that the outside market will again go higher than the Trust price. Opinions vary as to the future, some contending that production and consumption will soon or nearly equalize themselves, while others predict that demand will outrun consumption for some time yet. It is stated that foreign demand cannot be satisfied from some of the other usual foreign sources and that it must be met by American metal. Already in London in the last two weeks lead has advanced £2 10s. per ton, or from £49 15s. to £52 5s. We quote both the outside market and that of the leading interest at 8.75c., St. Louis, or 9c., New York. It is stated that as high as 9.75c. could be obtained for deliveries up to July 1.

Zinc.—A moderate business has been done in the past week for foreign and domestic account. Sales to foreign consumers have been made anywhere on a rising scale from 8.75c. to 9c., St. Louis, and galvanizers and brass makers have been purchasers of fair quantities. The improvement in exchange has also been a factor and quotations have also risen until to-day prime Western for deliveries into the second quarter are quoted at 9c., St. Louis, or 9.35c., New York.

Antimony—Wholesale lots for early delivery are unchanged at 11.62½c., New York, duty paid.

Aluminum.—For early delivery, wholesale lots of virgin metal, 98 to 99 per cent pure, are quoted at 31.50c. to 33c., New York.

Old Metals.—There has been a little better feeling in the market the past week in sympathy with the new metals market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	19.00
Copper, heavy and wire	18.00
Copper, light and bottoms	16.50
Brass, heavy	14.00
Brass, light	10.00
Heavy machine composition	19.00
No. 1 yellow rod brass turnings	12.00
No. 1 red brass or composition turnings	16.00
Lead, heavy	7.50
Lead, tea	5.50
Zinc	5.75

St. Louis

Feb. 23.—The non-ferrous markets were stronger and higher at the close of the week, lead selling at 8.65c. to 8.75c. and zinc at 9c. in car lots. In less than car lots quotations were: Lead, 9.25c. to 9.50c.; spelter, 9.50c. to 9.75c.; tin, 65c.; copper, 20c.; antimony, 14c. In the Joplin district ores were firmer as a result of the better feeling in the metal market. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 10c.; heavy red brass, 15c.; light copper, 13c.; heavy copper and copper wire, 16c.; pewter, 35c.; tinfoil, 43c.; aluminum, 22c.

New Steel Treaters Chapter at Boston

The Boston Chapter of the American Steel Treaters Society was recently organized by W. H. Eisenman, secretary of the national organization, Chicago. The first meeting was held on Friday evening, Feb. 13, attended by over 150. Prof. I. H. Cowdrey, instructor in mechanical engineering, Massachusetts Institute of Technology, presided, and a large membership was secured. Professor Cowdrey was elected secretary-treasurer and the following were chosen as the executive committee: Walter S. McIntosh, works manager S. A. Woods Machine Co.; Victor E. Hillman, metallurgist and chief chemist Crompton & Knowles Loom Works; Z. L. Sault, treasurer New England Annealing & Tool Co.; Frank G. Thurston, master mechanic American Tube Works. The chairman will be selected at the next meeting.

Manufacturers Elect Officers

At the annual meeting of the Association of American Steel Manufacturers, held in Pittsburgh on Friday, Feb. 20, Robert H. Irons, president of Central Iron & Steel Co., Harrisburg, Pa., was elected president, Jesse J. Shuman, inspecting engineer of the Jones & Laughlin Steel Co., vice-president, and J. O. Leech, manager of Bureau of Inspection & Tests, Carnegie Steel Co., was elected secretary and treasurer. C. F. W. Rys, chief metallurgical engineer of the Carnegie Steel Co., who has served the association as president for two years, was presented a handsome Chelsea clock.

The Bacon Motors Co., organized some time ago at Newcastle, Pa., states that it will begin the manufacture of motor cars in April and that by October, or shortly after, it expects to be turning out about 600 or more pleasure cars daily.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

(Prices quoted below represent as closely as they can be given those charged by mills to their regular trade for indefinite shipment. Owing to practical famine in supply of finished steel products and the heavy demand existing, tenders of new business are being made to the mills by jobbers and consumers at higher prices than those quoted below, but as a rule the mills are turning this offered business away.)

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Jan. 1, 1920, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5½c.; Denver, 99c.; Omaha, 59c.; minimum carload 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; St. Paul and Minneapolis, 49.5c.; minimum carload 46,000 lb.; Denver, 99c.; minimum carload, 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not noted above rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 2.70c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50, and shorter than 1 in., $2.00. Bright basic wire, $3 to $3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.50 base
Large boiler rivets.....$4.60 base
Small rivets .....50 per cent off list
Small machine bolts, rolled threads .....40, 10 and 5 per cent off list
Same sizes in cut threads.....40 and 5 per cent off list
Longer and larger sizes of machine bolts .....30 and 10 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter, rolled threads. 40 and 5 per cent off list
Cut threads .....30 and 10 per cent off list
Longer and larger sizes.....30 per cent off list
Lag bolts .....50 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....40 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter.....35 per cent off list
Longer and larger sizes.....25 per cent off list
Hot pressed and cold pressed sq. or hex. blank nuts .....2c. off list
Tapped nuts .....$1.75 off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:
⅝-in. and larger.....60 and 5 per cent off list
9/16-in. and smaller.....70 and 5 per cent off list
9/16-in. and smaller A. L. A. M. or S. A. E.....70, 10 and 5 per cent off list
Stove bolts in packages.....70 and 10 per cent off list
Stove bolts in bulk.....70, 10 and 2½ per cent off list
Tire bolts .....55 and 10 per cent off list
Track bolts .....6c. base

One cent per lb. extra for less than 200 kegs. Rivets in 100 lb. kegs 25c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $65; chain rods, $65 to $70; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ to 9/16 in. and larger, $3.60 per 100 lb. in lots of 200 kegs, of 200 lb. each or more; spikes, ⅝-in. and 7/16-in., $4.25; 5/16-in., $5; track bolts, $4.90 to $5. Boat and barge spikes, $4.25 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 3.00c. from mill. Common bar iron, 4.00c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe, applying as from January 14, 1920, and on iron pipe from January 7, 1920:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	1	+25
½	51	36½	⅜	25½	+ 1½
¾ to 3	54	41½	½	29½	11½
			¾ to 1½	34½	18½
			2 and 2½	33½	17½

Lap Weld

2	47	34½	1¼	24½	9½
2½ to 6	50	37½	1½	31½	17½
7 to 12	47	33½	2	28½	14½
13 and 14	37½		2½ to 6	30½	17½
15	35		7 to 12	27½	14½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	¼	+7	+40
½	48	35½	⅜	23½	6½
¾ to 1½	52	39½	½	28½	15½
2 to 3	53	40½	¾ to 1½	34½	19½
			2 and 2½	34½	19½

Lap Weld, extra strong, plain ends

2	45	33½	1¼	21½	6½
2½ to 4	48	36½	1½	27½	13½
4½ to 6	47	35½	2	29½	16½
7 to 8	43	29½	2½ to 4	31½	19½
9 to 12	38	24½	4½ to 6	30½	18½
			7 to 8	22½	10½
			9 to 12	17½	5½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	1¾ and 1⅞ in.	+20
2½ to 3¼ in.	30½	2 and 2¼ in.	+10
2¼ in.	24	2½ and 2¾ in.	+ 1
1¾ to 2 in.	19½	3 and 3¼ in.	— 1½
		3½, 4 and 4½ in.	— 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

	Cents per lb.
Blue Annealed—Bessemer	
Nos. 8 and heavier	3.50 to 4.00
Nos. 9 and 10 (base)	3.55 to 4.05
Nos. 11 and 12	3.60 to 4.10
Nos. 13 and 14	3.65 to 4.15
Nos. 15 and 16	3.75 to 4.25
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.15 to 4.65
Nos. 22 to 24	4.20 to 4.70
Nos. 25 and 26	4.25 to 4.75
No. 27	4.30 to 4.80
No. 28 (base)	4.35 to 4.85
No. 29	4.45 to 4.95
No. 30	4.55 to 5.05
Galvanized, Black Sheet Gage—Bessemer	
Nos. 10 and 11	4.70 to 5.20
Nos. 12 to 14	4.80 to 5.30
Nos. 15 and 16	4.95 to 5.45
Nos. 17 to 21	5.10 to 5.60
Nos. 22 to 24	5.25 to 5.75
Nos. 25 and 26	5.40 to 5.90
No. 27	5.55 to 6.05
No. 28 (base)	5.70 to 6.20
No. 29	5.95 to 6.45
No. 30	6.20 to 6.70
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.15 to 4.65
Nos. 17 to 21	4.20 to 4.70
Nos. 22 to 24	4.25 to 4.75
Nos. 25 to 27	4.30 to 4.80
No. 28 (base)	4.35 to 4.85
No. 29	4.40 to 4.90
No. 30	4.40 to 4.90
Nos. 30½ and 31	4.45 to 4.95

PERSONAL

No successor will be elected to Louis J. Campbell, who resigned as vice-president in charge of commercial relations of the Youngstown Sheet & Tube Co., Youngstown, Ohio, to become president of the Electric Alloy Steel Co., it was announced following directors' meeting for election of officers. These officers were re-elected: James A. Campbell, president; H. G. Dalton, Cleveland, first vice-president; C. S. Robinson, vice-president in charge of operation; Richard Garlick, vice-president in charge of finance and treasurer; William E. Manning, vice-president in charge of sales; Walter E. Meub, secretary; W. J. Morris, assistant secretary and assistant treasurer, and J. J. Brant, auditor.

E. F. Jones, for the past six months vice-president and general manager Elyria Iron & Steel Co., Elyria, Ohio, has been elected president of the Republic Rubber Corporation and the Republic Rubber Co., at Youngstown, Ohio, succeeding Guy E. Norwood, resigned. Mr. Jones has been in the manufacturing field for the past 30 years, first with the Illinois Steel Co., in various capacities, for a 10-year period; later with the International Harvester Co., for 12 years, filling responsible positions in practically every department, and then with the Morgan Spring Co., Worcester, Mass., as vice-president and general manager. Six months ago the Morgan Spring Co. was sold and Mr. Jones allied himself with the Elyria company. Majority of directors of the Republic Rubber Co. are successful iron and steel manufacturers in the Youngstown district.

C. D. Porterfield, formerly representing the Colonial Steel Co. in the New York territory, recently joined the sales force of Alfred Herbert, Ltd., machine tools, 54 Dey Street, New York, and will handle its steel and small tool lines in the metropolitan district and New York State. E. R. Wood, formerly of the selling organization of Messrs. Sherritt & Stoer, Philadelphia, has also joined the sales force of Alfred Herbert, Ltd., and will represent it in the New York district in the sale of imported and domestic machine tools and supplies.

John I. Isherwood, former first lieutenant of the 83rd Field Artillery, 8th Division, A. E. F., has become a salesman with the Eureka Fire Brick Works, manufacturer of clay fire brick, with offices in the First National Bank Building, Pittsburgh. Previous to entering the army service in August, 1917, he was studying chemistry at the University of Pittsburgh.

Thomas G. Bennett, formerly president of the Winchester Co., New Haven, Conn., has been made chairman of the board of directors, and John E. Otterson, formerly vice-president, has been elected president.

J. G. Coles, formerly of the Standard Forgings Co., has been appointed manager of sales, Kropp Forge Co., with offices at 5300 West Roosevelt Road, Cicero, Chicago.

Oliver J. Abell, president Abell-Howe Co., Chicago, has been elected vice-president of the American High Speed Chain Co., Indianapolis. Mr. Abell will divide his time between the two companies.

J. J. Loftus, for the past six years sales engineer for Reed-Prentice Co., Worcester, Mass., with headquarters in Detroit, has resigned to become associated with H. C. Wills Co., Marysville, Mich. He is succeeded by George B. Ashley, Detroit. Mr. Wills formerly was chief engineer of the Ford factory. His company is building an automobile plant at Marysville.

W. H. Keen has resigned as factory manager of the United States Copper Products Corporation, Cleveland, to take charge as manager of the tool steel production of the Hess Steel Corporation, Baltimore. Mr. Keen was with the Firth-Sterling Steel Co., later known as the Washington Steel & Ordnance Co. at Washington, where he was metallurgical superintendent, succeeding A. G. McKenna. Here his experience ranged from that of chief chemist in charge of the physical, chemical and research laboratories to metallurgical superintendent for over 10 years. On ordnance material, particularly armor piercing projectiles, he is considered an authority.

Fred C. Haumerson, for 15 years with the Mitchell Motors Co. and its predecessor at Racine, Wis., has resigned, effective March 1, to become associated with the Hexman Motors Co. of that city, organized to manufacture engine auxiliaries which he has designed and patented. For about 10 years Mr. Haumerson was manager of the service department of the Mitchell company and a year ago assumed the added duties of general sales manager.

Philip Wick, director Trumbull Steel Co., Warren, Ohio, and Paul Wick, vice-president and general manager Falcon Steel Co., Niles, Ohio, have been elected to the board of directors of the F. B. Stearns Co., Cleveland, automobile manufacturer.

Heman Ely, secretary Timken Roller Bearing Co., Canton, Ohio, left a few days ago for Europe and will visit England, France and Italy with a view of opening new markets for his company's products.

Francis Davies, formerly assistant to R. W. Valls, vice-president and chief engineer of the Champion Engineering Co., Kenton, Ohio, has been appointed to the New York office of the company, 149 Broadway. J. W. Spensley is manager.

O. B. Newton, general sales agent of the Virginia Iron, Coal & Coke Co., Roanoke, Va., has resigned to engage in other business. J. F. Hunter has been appointed acting general sales agent, effective Feb. 17.

A. C. Perrin has been appointed general manager of the Hendrickson Truck Crane Co., 352 Peoples Gas Building, Chicago.

W. V. Houck was, up to Feb. 1, factory manager of the Buffalo Metal Goods Co., Fillmore Avenue, Buffalo, N. Y., a subsidiary plant of the General Motors Corporation, and on the above-mentioned date severed his connections with that firm to become vice-president and general manager of the O'Neil Iron Works, Inc., Buffalo.

Edward A. Lembeck, formerly in the sales offices of the Republic Iron & Steel Co., Youngstown, Ohio, has been transferred to the sales offices of the company in the Oliver Building, Pittsburgh.

O. Byrd Newton has been elected secretary and treasurer of the Old Dominion Coal, Iron & Coke Corporation, Roanoke, Va., vice C. W. Owen, resigned to engage in other business.

F. J. Mawby, with the sales force of Manning, Maxwell & Moore, Inc., and located at the New York office for a number of years, severed his connection with them, Feb. 1, and is now a member of the sales organization of the Cincinnati Shaper Co. and Cincinnati Gear Cutting Machine Co., Cincinnati. During the war Mr. Mawby did engineering work in connection with the equipping of shops for making ammunition, guns and gun carriages for both foreign and the United States governments, and was responsible for the development of a number of special machines for rapid production on time and high explosive fuses.

W. H. Morris, formerly superintendent of the mining department of the Cambria Steel Co., Johnstown, Pa., recently was appointed general superintendent of the Peerless Coal Co. and the Mineral State Coal Co., properties of which are located at Buckhannon and Moundsville, W. Va., with main offices in Baltimore.

Several additions and changes in the sales and advertising departments of the Square D Co., electrical safety devices, Detroit, became effective Feb. 1. E. A. Printz, formerly district sales manager of the Chicago territory, was made sales manager, A. MacLachlan continuing in the capacity of secretary and director of distribution. D. M. Stone, formerly district sales manager of the Pittsburgh territory, was made

district sales manager of the Detroit territory. J. A. Jaques, formerly in charge of the New York territory as district sales manager, was given the district sales managership of the Pittsburgh territory, and H. W. Spahn, district sales manager of the Buffalo territory, was placed in charge of New York. D. H. Colcord, formerly of the department of publicity of the Westinghouse Air Brake Co. of Pittsburgh, was appointed director of research engineering. The annual sales conference of the Square D Co. was held at the Hotel Statler, Detroit, Feb. 16, 17 and 18.

J. E. Fitzgerald, assistant general manager of sales of the Brier Hill Steel Co., Youngstown, Ohio, and A. E. Quere, in the sales department of the same company, located at Youngstown, have resigned, effective March 1, to engage in the sale of iron and steel products on a jobbing basis, with headquarters at Niles, Ohio. Mr. Fitzgerald has been with the Brier Hill company eight years, four years in the sales department and for the past four years as assistant general sales manager. Previously he had been superintendent of schools at Wooster, Ohio, at Geneva, Ohio, and before that, principal of the Central Grammar building at Warren, Ohio. Mr. Quere has been with the Brier Hill Steel Co. two and one-half years, for a year and four months in the traffic department and since then in the sales department. For eight years prior he was traveling freight agent out of Cleveland for the Empire company, subsidiary of the Pennsylvania railroad and the New York Central system.

At the last annual meeting of the Eagle Picher Lead Co., held in Cincinnati, Feb. 17, Dr. John A. Schaeffer, for the past nine years chief chemist and chief metallurgist of the company, with his headquarters at Joplin, Mo., was made a vice-president of the company, with his headquarters in St. Louis and offices in the Railway Exchange Building at Sixth and Olive streets. Dr. Schaeffer will be in entire charge of all the operations of the company in and about St. Louis. The St. Louis sales office of the Eagle Picher Lead Co., formerly in the Benoist Building, will now be a part of Dr. Schaeffer's offices in the Railway Exchange Building.

J. D. Jones has been appointed general manager of the Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont., effective Feb. 21.

W. D. Myers, for the past four years auditor of the Brier Hill Steel Co., Youngstown, has been elected treasurer of the Electric Alloy Steel Co. and will assume his new duties March 1. He will be succeeded at the Brier Hill company by J. V. Schrock, who has been chief clerk of the Carnegie Steel Co. in the Youngstown district. Mr. Myers has been with the Brier Hill Steel Co. since 1912 and served as assistant auditor before becoming auditor. He was previously auditor of the old Empire Iron & Steel Co. at Niles, Ohio, one of the constituent companies which formed the Brier Hill company. He went to Niles from Pittsburgh where he was with the American Sheet & Tin Plate Co. Mr. Schrock has been closely identified for a number of years with James H. Grose, new president of the Brier Hill Steel Co., who was formerly district superintendent at Youngstown of the Carnegie Steel Co.

V. L. Curren has severed all his connections with the Jackson Screw Products Co., Jackson, Mich. A. A. Siamieski has been appointed assistant general manager to fill the vacancy.

George V. McMahan, for ten years assistant general manager at Anderson, Ind., of the Remy electric division of the General Electric Co., has resigned to join the Anchor Engineering Co., now organizing at Anderson.

Robert McC. Carter, for many years a member of the sales department of the Gisholt Machine Co., Madison, Wis., has resigned to accept the position of sales manager of the Giddings & Lewis Co., Fond du Lac, Wis., manufacturer of machine tools.

Edward L. Nixon, formerly manager of sales of the Pittsburgh offices of E. S. Jackman & Co., has resigned to become district manager of sales at Cleveland for the Federal Tool & Alloy Steel Corporation, New York, with offices at 1280 Ontario Street, Cleveland.

OBITUARY

JOSEPH M. FLANNERY, aged 52, died of pneumonia at his home in East End, Pittsburgh, Wednesday, Feb. 18. He had been in poor health for several months. Mr. Flannery lived in Pittsburgh nearly all his life, and was instrumental in organizing some leading industries in that city, among which were the Meadow Lands Coal Co., the Flannery Bolt Co., the American Vanadium Co., the Standard Chemical Co. and the Rozanoff Process Co. He was president of the Standard Chemical Co. Mr. Flannery was very largely instrumental in the development of the vanadium industry in this country. Convinced of the value of vanadium in the manufacture of steel, he went to South America, where he secured the world's largest vanadium deposits in Peru. Through his interest in vanadium his attention was called to an ore found in Colorado, which contained radium. Having heard of the possible use of radium in the treatment of cancer he determined to undertake its production. In 1911 he organized the Standard Chemical Co., and after overcoming many obstacles, this pioneer company is said to be to-day the world's largest producer of radium. Mr. Flannery was a member of the Duquesne Club, Pittsburgh Athletic Association, Denver Athletic Club and Railway Club of Pittsburgh.

Concerning Mr. Flannery's experiments and inventions a friend of his, Hamilton Foley, Pittsburgh, writes:

"With a thought for additional contribution to the efficiency of the armed forces of the country during the war, Mr. Flannery heard with keen interest of the completion of the Browning machine gun. He had long believed that in uranium steel he had a material that would give a gun barrel better able to withstand the erosion that so quickly injures artillery. As soon as the Browning machine gun was announced he presented the Ordnance Department of the army with what steel makers that knew declared gems of the steelmaker's art, in four bars of electric furnace made uranium steel. At one of the arsenals these were made into barrels for a Browning gun and fired. They stretched one-half of one thousandth of an inch and they were put aside. When the final report reached Mr. Flannery, he noted what no one else had caught, that these four bars of uranium steel had been made into gun barrels and fired without annealing.

"Temporarily set back in his desire to serve the artillery, Mr. Flannery presented to the aviation section of the army and the navy an all-steel aeroplane propeller made from a steel tube. Experts declared that it could not be made. Mr. Flannery's men proved that it could and the army gave Mr. Flannery and his associates $10,000 as soon as a propeller of that class was made and tested.

"Mr. Flannery and his associates made the propeller and received the sum agreed upon. Then appeared the "back yard propeller" that would make it possible to start and to stop an airplane within 50 yards. In its plan and design it seemed excellent and in trial one of these propellers gave good results, but Mr. Flannery's men had a better and finer all-steel, adjustable blade reversing propeller, and while Mr. Flannery's body was awaiting burial official word was received from the army aviation authorities that the Government is ready to contract to pay $20,000 as soon as he can deliver one of his new adjustable blade, reversing, all-steel propellers.

"Until the aviation authorities received and tested

the all-steel aeroplane propeller that Mr. Flannery first presented to their attention, there had been none such actually made so that it would stand a real test. The completion of the newer and all-steel adjustable blade, reversing propeller, means that the Government will have one with which an aviator can leave the ground within a shorter space, and that when he has to make a forced landing he can choose his place within a distance immeasurably less than that in which he now has to trust to fate. Furthermore, the ability to adjust the angle of the blades of his propeller while in flight means that an aviator can accommodate his machine to the air at different altitudes, and that he can economize in his oil supply in a way that has seemed a dream until this propeller was fathered by Joseph M. Flannery.

"The high regard of the medical profession for radium as a therapeutic aid, really gives to Mr. Flannery all the reward that most men would find satisfactory. When it is considered that five years ago radium was being tabooed by most as a quack remedy, and that now, at the recent congress of all the distinguished surgeons of America, Dr. Will Mayo of the Rochester clinic, in his presidential address did not hesitate to say that the surgeon who now operated without using radium in the ways in which it has proved its usefulness is not doing his duty to his patient, there is reason to believe that in making this metal available to the surgeons of the world Mr. Flannery has given to America and to Pittsburgh an honor second only to that belonging to Paris, as the place where Madame Curie discovered this element."

WILLIAM E. DIEHL, sales manager Corbin Screw Corporation, New Britain, Conn., whose death Feb. 10 was briefly mentioned in THE IRON AGE Feb. 19, had been employed for the last 20 years in different excutive positions by either the Russell & Erwin Mfg. Co. or the Corbin Screw Corporation. He joined the forces of the Russell & Erwin Mfg. Co. as purchasing agent in 1899, remaining in that position until 1904 when he was transferred to the New York warehouse of the Russell & Erwin Mfg. Co. as sales manager. In 1907 he became identified with the Corbin Screw Corporation, going to Chicago as manager of that company's warehouse in that city. After serving seven years in Chicago, in which city he surrounded himself with many friends and was universally respected, he came to the home office at New Britain, Conn., as sales manager, in 1914.

JOHN B. JOHNSTON, secretary St. Paul Foundry Co., St. Paul, Minn., died recently. He was associate manager of this company for 31 years. Mr. Johnston was born July 15, 1857, being the first white child born in Waseca County, Minn. When a boy of nine the family moved to St. Paul, where he was educated and has since lived. At the age of 16 he began his business career and had been identified with the business interests of St. Paul since that time. He was president for several years of the St. Paul Manufacturers' Association and an active member of various business organizations in St. Paul up to the time of his death.

HARDY GREENWOOD, district sales agent at Dallas, Tex., of the Youngstown Sheet & Tube Co., Youngstown, Ohio, died recently at Watertown, N. Y. Greenwood left Dallas to attend the annual sales convention of the company in January at Youngstown. Business called him to Watertown, where he was stricken by malarial fever prior to the sales gathering. The Sheet & Tube company took charge of the body at Watertown and dispatched a representative to accompany it to Dallas.

HERMANN GEHNRICH, 68, president Gehnrich Indirect Heat Oven Co., Brooklyn, died at his home in Brooklyn, N. Y., Feb. 18. He established the business in 1880, which was incorporated in December, 1915.

ISAAC W. ROGERS, president, and William D. Piper, vice-president of the Patric Furnace Co., Springfield, Ohio, died within a few minutes of each other on Feb. 6. Mr. Rogers was 83 years old and was born in Springfield. He was one of the founders of the American Seeding Machine Co. Mr. Piper was born in Virginia, 72 years ago, and had been connected with the Patric company for the past 40 years.

ARTHUR WILZIN, managing director of the Paris office of E. W. Bliss & Co., Brooklyn, N. Y., died at Nice, France, Jan. 2 after a brief illness. He had been in charge of the company's European interests since 1895. Prior to that he was with Stiles, Barker & Co., Middletown, N. Y., which was absorbed by the Bliss company.

JOHN M. JONES, 71, for ten years director of service at the principal executive offices of the Youngstown Sheet & Tube Co., Youngstown, Ohio, died Feb. 18, following a week's illness of influenza and bronchial pneumonia. In his younger years he worked as a puddler in Mahoning Valley mills.

WILLIAM H. BRADLEY, for some years vice-president and treasurer of the Duff Patents Co., Inc., Frick Building, Pittsburgh, builder of Duff and Bradley water seal gas producers and light and heavy plate work, died at his home in Bellevue, Pa., on Saturday, Feb. 14.

STEWART DYER, aged 30, superintendent of the coal and coke works of the Shenango Furnace Co. at Wilpen, Pa., died at his home in Ligonier, Pa. He was a son of C. D. Dyer, vice-president of the Shenango Furnace Co., Oliver Building, Pittsburgh.

HAROLD MCGILL DAVIS, advertising manager Sprague Electric Works of the General Electric Co. since 1899, died Feb. 9 at his home in Brooklyn, N. Y., after an illness of about three weeks, aged 60 years.

WALLACE F. ROBINSON, one of the founders of the United Shoe Machinery Co. and for many years its first vice-president, died at his home in Boston Feb. 16, aged 87, after an illness of about a month.

NATHANIEL O. GOLDSMITH, general manager Weir Frog Co., Cincinnati, Ohio, died at his home in Norwood, Feb. 16. Mr. Goldsmith had been connected with the Weir concern for over 30 years.

C. D. HINE, a director of the Youngstown Sheet & Tube Co., Youngstown, Ohio, and a prominent attorney of that city, died in Pasadena, Cal., on Sunday, Feb. 22.

GEORGE W. HERRICK, president Herrick Co., wholesale metals, 47-49 Broad Street, Boston, died at his home in Malden, Feb. 13, of heart trouble.

JOHN N. WOODFIN, bank president and head of the Lincoln Iron Works, Rutland, Vt., died at his home there, Feb. 23, from pneumonia.

JOHN NAZEL, Nazel Engineering & Machine Works, Philadelphia, died at his home Feb. 16.

New Drop Forging Company at Milwaukee

The Interstate Drop Forge Co., Milwaukee, has been organized by a number of prominent Milwaukee and Chicago business men to manufacture commercial drop forgings for the automotive and machinery industries. A 9-acre tract close to the A. O. Smith plant has been obtained and building operations will be started immediately. The Northwestern Bridge & Iron Co. of Milwaukee has obtained the contract for the forge plant and the machine shop. The plans call for an initial expenditure of $175,000 for buildings and equipment, and the plant is to be in operation within three months. The Chambersburg Engineering Co. has obtained the contract for the hammers and other equipment will be ordered immediately.

The president of the new company is Wm. C. Frye, who is also president of the Chain Belt Co. and secretary of the Sivyer Steel Casting Co. Major S. M. McFedries is vice-president and general manager. Major McFedries was formerly the sales manager of the Cutler-Hammer Co. and during the war was in charge of the production division, Ordnance Department, in the Milwaukee district. C. R. Messinger, the treasurer of the company, is also vice-president and general manager of the Chain Belt Co. and the Sivyer Steel Casting Co. The directors are Edgar L. Wood, C. R. Messinger, Wm. C. Frye, S. M. McFedries, B. Fleeger, and J. M. Olmsted of the Electric Steel Co. of Chicago.

Machinery Markets and News of the Works

A CHECK IN INQUIRY

Buyers Awaiting Favorable Market Turn

Large Manufacturers Active Purchasers—Government Tools Affect Chicago Trade—Railroads Hold Off Buying

A disposition to withhold from entering the market is now noticeable in important machine-tool centers. It is not definitely developed yet whether recent price advances or distant deliveries have acted the more to cause this. Recent heavy buying may have contributed to the condition in some instances, and the uncertainty of the money situation is believed to have a similar bearing. Some temporary contraction in buying in the immediate future is therefore expected. The inability of buyers to satisfy their needs for machines for prompt shipment may be taken as a further substantial influence to the letup in the buying movement.

New inquiry, however, although in smaller volume, is not lacking. The Detroit Gear & Machine Co., Detroit, is in the market for over 100 machines for extensions in its toolroom. The Honolulu Iron Works, Honolulu, T. H., is inquiring for $100,000 worth of machine-shop equipment.

Orders have been placed by the Packard Motor Car Co., Detroit, for 30 screw machines, by Henry Ford & Son for 23 screw machines for their Hamilton, Ohio, tractor plant, by the Willys Corporation for about $150,000 worth of standard tools for its new automobile plant at Elizabeth, N. J., by the New Britain Machine Co., New Britain, Conn., for about 50 machines totaling over $200,000, by the Columbia Graphophone Co., Fitchburg, Mass., for 31 screw machines and by the Goodyear Tire & Rubber Co., Akron, Ohio, for a round lot of presses for its new rim plant.

Characteristic delay by railroads in buying machine tools is reported again, no allotments having been made from the Nickel Plate or the Missouri, Kansas & Texas lists so far as can be ascertained. It is understood that the latter has been withdrawn.

Oil companies continue to be the most prominent buyers in some Mid-West machine-tool centers.

The sale of Government tools is a prominent factor in the Chicago market for the time being, over 400 tools having been recently offered by the local District Salvage Board of the Ordnance Department, and the strength of this influence is attributed to extended delivery offered on some lines of new equipment.

Crane sales continue good with heavy inquiries, particularly for hand power cranes. One manufacturer of hand power cranes in his New York office received about 30 separate inquiries within 24 hours. A large number, however, are for estimating purposes, among these being the railroads who are anticipating the end of Government control. A number of manufacturers report a shortage of small alternating current motors.

New York

NEW YORK, Feb. 24.

Further evidences of contraction in machine-tool buying are at hand. Some companies report no marked curtailment in their business, but a majority of sellers find buyers more reluctant to commit themselves, especially for machines which makers cannot deliver for several months. The hesitation in business is due no doubt to the uncertainties of the money situation, many prospective borrowers having found it difficult to obtain bank accommodation; also to the railroad embargoes effective in the East which have more or less paralyzed manufacturing activities at some points, notably in New England.

The Willys Corporation continues to buy equipment for its new automobile manufacturing plant at Elizabeth, N. J., one order for standard tools recently placed aggregating about $150,000. The New Britain Machine Co., New Britain, Conn., is another large buyer, having closed for 50 machines, totaling more than $200,000. The Perth Amboy Dry Dock Co., Perth Amboy, N. J., is buying shop equipment.

Smaller buyers include the Safety Car Heating & Lighting Co., New York; the Hart Roller Bearing Co., East Orange, N. J.; the Crane Co., Bridgeport, Conn.; the Charles Burroughs Co., Newark, N. J., and the Petroleum Heat & Power Co., formerly the Fess Rotary Oil Burner Co., which will build a new plant at Stamford, Conn. The International Motor Co. has also placed additional orders.

The Empire Cream Separator Co., Bloomfield, N. J., is expected to place further orders this week.

Crane business continues good with heavy inquiries, particularly in the hand-power crane field. One manufacturer of hand-power cranes in his New York office received about 30 separate inquiries within 24 hours. A large number however, are for estimating purposes, particularly those from the railroads, which are anticipating the end of Government control. A number of manufacturers are encountering difficulty in obtaining small alternating current motors. The American Smelting & Refining Co., New York, who recently sent out a few inquiries on a 10-ton, 57-ft. span overhead traveling crane are not in the market at present. The inquiry was for estimating purposes. The Lehman Machine Co., St. Louis, is in the market for a 5-ton, 40-ft. span overhead traveling crane. The J. G. White Engineering Co., New York, is inquiring for eight 8-ton 37 ft. 10-in. span hand-power cranes for shipment to Texas.

Among recent crane sales are three 30-ton, 60-ft., 75-ft. and 80-ft. span overhead traveling cranes sold by the Champion Engineering Co. to the General Electric Co., Erie, Pa. This makes a total of 20 Champion cranes in this plant. The E. I. du Pont de Nemours Co., Wilmington, Del., has purchased two 4-ton overhead traveling cranes. The Phoenix Utilities Co. has purchased for shipment to Texas one 20-ton, 28-ft. 3-in. span overhead traveling crane from the Chesapeake Iron Works. The Todd Shipyards Corporation, New York, has purchased one 10-ton, 37-ft. span overhead traveling crane from the Niles-Bement-Pond Co. The Hartford Electric Light Co., Hartford, Conn., has purchased a 20-ton, 50-ft. boom locomotive crane from the Ohio Crane Co. through the J. G. White Engineering Co. The Shepard Electric Crane & Hoist Co. has sold a 6½-ton, 80-ft. span grab-bucket crane to the Chemical Construction Co., Charlotte, N. C.; one 5-ton grab-bucket crane to the Federal Sugar Refining Co., New York; and a 5-ton grab-bucket crane to the American Glue Co., Boston. The Stanley Works, New Britain, Conn., has purchased a 10-ton overhead traveling crane from Manning, Maxwell & Moore. Westinghouse, Church, Kerr & Co. have purchased for a power house of the American Rolling Mills Co. at Zanesville, Ohio, a 10-ton, 39-ft. span overhead traveling crane of the Champion Engineering Co. The 15-ton crane to the American Smelting & Refining Co., reported here last week, was sold by the Niles-Bement-Pond Co. instead of the Pawling & Harnischfeger Co. The Perth Amboy Drydock Co., Perth Amboy, N. J., has purchased two 10-ton, 27-ft. and 38-ft. 6-in. span overhead traveling cranes from the Niles-Bement-Pond Co.

Knorr Brothers, 1112 Wyckoff Avenue, Brooklyn, manufacturers of metal bound casks, etc., have awarded a contract to Becker & Rueger, 272 Scholes Street, for a new plant at Cooper Street and Evergreen Place, Long Island City, to cost $30,000.

The Portable Machinery Co., Passaic, N. J., manufacturer of steel wagon loaders, has increased its capital stock to $300,000, and has arranged for a new plant, 100 x 400 ft., at Clifton, N. J. J. L. Wentz is president.

The Peerless Tube Co., Locust Avenue, Bloomfield, N. J., has increased its capital stock from $200,000 to $500,000.

The Flyoplane Co., 527 Park Avenue, Hoboken, N. J., has filed notice of organization to manufacture mechanical toys. Fred Mehringer, 329 East Tenth Street, New York, and William Wizeman, 312 Sixth Street, West New York, N. J., head the company.

The Joshua Collinson Fence Co., East Orange, N. J., has been incorporated with a capital stock of $15,000 by Joshua Collinson, Robert L. Roney and E. F. Roney, 10 Walnut Street.

A one-story power plant, 50 x 100 ft., will be erected by John Campbell & Co., chemical manufacturer, Plum Point Lane, Newark, N. J. Percy B. Taylor, Essex Building, is the engineer.

The General Alloy Co., 117 Walnut Street, Newark, N. J., has awarded a contract to Dillen & Wiley, 214 West Thirty-fourth Street, New York, for a two-story plant, 35 x 120 ft., on New Jersey Railroad Avenue.

Fire, Feb. 13, destroyed a portion of the plant of the Sterling Bobbin Works, West Nineteenth and Grand streets, Weehawken, N. J., manufacturer of textile equipment, with loss estimated at $15,000.

The New Brunswick Iron & Metal Co., New Brunswick, N. J., has been incorporated with a capital stock of $100,000 by J. C. and B. S. Marcus and Irving Laurie.

The Elmira Foundry Co., Main Avenue, Elmira, N. Y., has awarded a contract to the H. K. Ferguson Co., Cleveland, for an addition to cost about $200,000 including equipment.

The Efficiency Electric Corporation, 124 White Street, New York, has increased its capital stock from $150,000 to $300,000.

The Astoria Light, Heat & Power Co., Shore Road, Long Island City, N. Y., has completed plans for a new two-story generator works, 60 x 360 ft., at Van Alst and Winthrop avenues, with cost estimated at $150,000.

J. I. Robin & Sons, Inc., New York, has been incorporated with a capital stock of $250,000 by E. London, J. I. and B. J. Robin, 130th Street and Park Avenue, to manufacture brass and other electric and gas fixtures.

The Harriman Products Co., New York, has been incorporated with a capital stock of $50,000 by W. L. Moseley, J. L. Marshall and G. V. Harriman, 34 Vermilyea Avenue, to manufacture automobile and airplane parts.

L. Mundet & Sons, Ferris Street, Brooklyn, have completed plans for a four-story reinforced-concrete cork and insulation product plant, 190 x 200 ft., in the Ridgewood section of the city, to cost about $400,000 including equipment.

The American Diesel Engine Co., New York, has been incorporated in Delaware with a capital stock of $1,000,000 by F. X. Hennessey, Wallace Ingraham and Henry P. Molloy, attorney, 25 Broad Street.

The E. W. Bliss Co., ordnance department, Fifty-third Street and First Avenue, Brooklyn, has filed plans for a one-story brick addition, 81 x 100 ft., on Fifty-fourth Street, to cost $12,500.

The Houpert Machine Co., Harris Avenue and Marion Street, Long Island City, N. Y., has leased property at 351 Halsey Street, running through to 36 Nevada Street, Newark, N. J., for a branch works.

The Allen & Arnick Garage Co., 74 Hudson Avenue, Albany, N. Y., is taking bids for a three-story repair and service building, 40 x 80 ft., to cost $30,000.

The Aetna Machinery Corp. was recently incorporated in New Jersey with principal offices and warehouse at 15 Mechanic Street, Newark, N. J. At this date the corporation has no other branches or offices. Its capital until Jan. 1 was $10,000. This capital was increased to $100,000 in order to furnish sufficient additional capital to enable it to purchase a modern one-story concrete building with a 25-ton traveling crane. This building will be built especially for handling new and used machinery. Plans have been drawn to erect a machine shop for rebuilding used machine tools, and this machine shop will include a 16-ft. planer, 42-in. boring mills, a 24-in. shaper, 16-in. shaper, 36-in. vertical drill, a universal milling machine, a keyseater, lathes, etc. Plans have also been completed whereby the company will very soon offer on the market several machines of its own make, including a back-geared Fox monitor lathe, a back-geared crank shaper with V-ram in three sizes, 16, 20 and 24-in., and a hand surface grinder. Herbert I. Segal is president.

A one-story boiler plant to cost about $19,000 will be erected by the Farmers' Feed Co., Newark, N. J., at its works at Passaic Avenue and Chapel Street.

The Electric Sun Co., Asbury Park, N. J., has been incorporated with a capital stock of $80,000 by Charles T. Day, Arthur J. Haight and Albert Klebs to manufacture electric signs.

Two service buildings and repair plants for automobiles, to cost about $180,000, will be erected by the American Realty & Investment Co., Newark, N. J., to be occupied by the Buick Motor Co. and the Poertner Motor Car Co., both of Newark, to comprise respectively a one-story structure, 121 x 234 ft., at Broad and Essex streets, and two stories, 80 x 120 ft., in the immediate vicinity.

Contract for a mill building for the Shuttleworth Brothers Co., manufacturer of carpets and rugs, Amsterdam, N. Y., has been awarded to the Turner Construction Co., 242 Madison Avenue, New York. It will be of reinforced concrete, six stories, 62 x 300 ft., costing approximately $400,000.

Philadelphia

PHILADELPHIA, Feb. 24.

Sales of machine tools have been very satisfactory in this market in the past two weeks, but there is now some indication of a slight falling off in inquiries. The Westinghouse Electric & Mfg. Co., South Philadelphia, has been the principal buyer, its purchases having totalled $100,000 or more. The Baltimore & Ohio Railroad is getting quotations on equipment, some of which is for the Ivorydale shops near Cincinnati. It is expected that the road will buy shortly after March 1. The Pennsylvania Railroad has received a good many quotations on machines in the past two or three months, and will probably buy after the roads are returned to private ownership. Second hand tools are in good demand, this being due in large measure to the long deliveries on new tools. Two Pennsylvania manufacturers are disposing of large lots of tools through a Philadelphia dealer.

Dupont Motors, Inc., which as announced in THE IRON AGE of Feb. 19, has been formed to succeed the Dupont Motor Mfg. Corporation, will build a new plant at Moore, Pa., near Philadelphia. It is expected that the company will eventually buy considerable equipment. The Fox Motor Co., Philadelphia, is undertaking new financing preparatory to expansion. It will manufacture an automobile with air-cooled engine and is expected to buy a list of equipment.

The Landis Machine Co., Waynesboro, Pa., plans to enlarge its factory space to double its output. A housing program and the erection of a foundry, warehouse and pattern shop are among its projects. John G. Benedict is general manager and treasurer.

The Lebanon Valley Iron & Steel Co., Hebron, near Lebanon, Pa., will soon engage in rivet manufacture, installing a number of rivet machines.

The shear shop of the Lalance-Grosjean Mfg. Co., Harrisburg, Pa., was completely destroyed by fire on Feb. 4. The mill will be rebuilt, it is expected. John Grey is superintendent.

Fire in the foundry of the Reading Steel Casting Co., Reading, Pa., on Feb. 2, caused damage of approximately $10,000. Repair work is already under way.

The Anderson Motor Co., York, Pa., has purchased seven adjoining properties for additions. It is planned to start the work about April 1.

The Pennsylvania Equipment Co., 1420 Chestnut Street, Philadelphia, is in the market for one 1250 or 1500-kw. and one 2250 or 2500-kw., alternative two 1750 kw., or alternative, one 3500-kw. maximum rating turbo-generator, three-phase, 60-cycle, 480 volts; surface condenser, super-heated steam at 200 or over preferred; boilers 750 hp. or larger preferred with economizers. Natural gas is used. It is also in the market for Niles wheel presses, good for 150 tons, 39 in. between strain bars.

The facilities of the Harrisburg Mfg. & Boiler Co., Harrisburg, are already turning out Hurlburt commercial trucks ranging from 1½ to 7 tons capacity. Inability to get sufficient material, however, is delaying production somewhat at this time, according to President S. F. Dunkle. During the past week an order for trucks for Spain was received, and during the past few weeks other large orders have been shipped to India, England and Canada.

Thomas P. Conard, 2 South Fifteenth Street, Philadelphia, is inquiring for several machines for delivery to the Pacific Coast. These include a 14-in. automatic heavy-duty milling machine, a 16-in. engine lathe, a 16 x 72-in. grinding machine and a hobbing machine.

The plant of the Mann Edge Tool Co., Lewistown, Pa.,

manufacturer of axes, was burned to the ground Feb. 16, entailing a total loss reported to exceed $100,000. The company has been producing 1800 axes daily. The plant will be rebuilt at once, according to S. B. Weber, treasurer.

The T. B. Woods Sons Co., Chambersburg, Pa., manufacturer of pulleys, etc., has placed its plant on a 9-hr. working basis owing to increased business.

The Bryden Horse Shoe Works, Catasauqua, Pa., has suspended work in a number of departments owing to lack of coal.

The Elliott-Fisher Co., Harrisburg, Pa., manufacturer of typewriters, billing machines, etc., has acquired property aggregating about 20 acres between Derry Street and the Almshouse, as a site for a new plant. It is said that several buildings will be constructed later in the year, and that the present works on Cameron Street will be removed to the new locality.

The Pennsylvania Optical Co., South Eighth Street, Reading, Pa., is having plans prepared for a plant addition, 66 x 100 ft., to cost $50,000.

Fire, Feb. 12, destroyed the larger part of the plant of the Eberly & Orris Mfg. Co., Mechanicsburg, Pa., manufacturer of wagon parts, spokes, etc., with loss estimated at $100,000. The company recently ordered a quantity of new machinery and this was destroyed in the fire, including that still waiting to be placed in service. The plant was three stories, 100 x 200 ft.

The Bennett Estate, Wilkes-Barre, Pa., will build a three-story automobile service and repair works, 60 x 100 ft., on North Main Street, to cost $50,000.

The Trenton Steel & Wire Co., Trenton, N. J., has been incorporated with a capital stock of $100,000 by Thomas A. and Duncan MacKenzie, and Edward J. Scudder, to manufacture wire and steel products. The MacKenzie interests in the new company are connected with the Duncan MacKenzie's Sons Co., operating a machine works at Hamilton Avenue and Clark Street.

Kruse & Slattery, 730 Cherry Street, Philadelphia, manufacturers of tools, have completed plans for a two-story plant at Camden, N. J., 50 x 100 ft., to cost $25,000.

J. Osborne Hunt, architect, 114 North Montgomery Street, Trenton, N. J., has plans under way for a new tire and rubber manufacturing plant for the Gibraltar Tire & Rubber Co., at Thirteenth Street and the Boulevard, West New York, N. J.

Allison & Co., Chester, Pa., manufacturers of forging furnaces, etc., have had plans prepared for a one-story steel addition, 60 x 200 ft., to cost about $200,000.

The Exeter Machine Works, Exeter, Pa., is planning for a two-story foundry, 50 x 150 ft., to cost $70,000.

Louis N. McCarter, Norristown, Pa., formerly president and general manager R. S. Newbold & Son Co., manufacturer of machinery and parts, and who recently withdrew from this connection, has organized a new local company with capital of $100,000 to manufacture similar products. The former Stritzinger grist mill property, adjoining the plant of the Eagle Iron Works, has been acquired, and this will be remodeled as a machine shop and mechanical plant, including a plate department. It is proposed to have the works ready for operation early in May.

The Apperson Automobile Co., Broad and Race streets, Philadelphia, is having plans prepared for a six-story reinforced-concrete service and repair works, 60 x 100 ft.

The Ace Metal Co., 716 South Eleventh Street, Philadelphia, is having plans prepared for works improvements to cost about $50,000.

The Bessemer Motor Truck Co., Widener Building, Philadelphia, has awarded a contract to E. E. Hollenback, Inc., 1804 Brandywine Street, for its new one and two-story plant, 100 x 100 ft., at Holmesburg Junction, to cost $100,000.

A new machine shop to cost $20,000 will be erected by Gillinder & Sons, Inc., Philadelphia, at their glass works at State Road and Devereaux Street.

Stanley G. Flagg & Co., 1421 Chestnut Street, Philadelphia, iron and steel merchants, will build a one-story power plant at their works at Stowe, Pa., 47 x 60 ft.

The General Tractors Corporation, Paulsboro, N. J., has suspended operations at its local plant, which has only been running a short time, effective Feb. 16. The company acquired an existing factory and has made numerous improvements and extensions to accommodate the new business. It is said that the cause for the shut-down is due to inability to secure materials.

The U-Co., Atlantic City, N. J., has been incorporated with a capital stock of $25,000 by B. G. Ulizio, Carlton Geist and W. S. Clement, to manufacture metal heat-treating equipment and operate a heat-treatment plant.

Buffalo

BUFFALO, Feb. 24.

The Radder Vending Machine Co., Seneca Falls, N. Y., has been incorporated with a capital stock of $75,000 by H. Goodnough, H. H. and O. C. Radder, Watertown.

The Geneva Automobile Co., 145 Castle Street, Geneva, N. Y., is planning for a two-story service and repair works addition, to cost about $40,000. Machine tools for light work will be installed.

The Rome Electrical Co., South Jay Street, Rome, N. Y., manufacturer of insulated wire, etc., has had plans prepared for a one-story addition, 50 x 90 ft., to cost $20,000.

The Medina Iron & Brass Co., Medina, N. Y., is considering the erection of a one-story foundry addition.

Meyer-Wilcox, Inc., Syracuse, N. Y., has filed notice of change of name to the Onondaga Automotive Corporation.

The Pritchard Stamping Co., Rochester, N. Y., is arranging for the sale of its local plant comprising a two-story and basement works, containing about 100,000 sq. ft. manufacturing area on a 2-acre site.

The Pine Tree Milking Machine Co., Syracuse, N. Y., has been incorporated with a capital stock of $100,000 by H. B., F. K. and G. Bapson.

The Brown, Lipe, Chapin Co., Syracuse, N. Y., manufacturer of gears and transmission, has completed plans for a five-story plant on Ontario Street, 70 x 297 ft., for the production of gears, to cost with equipment about $300,000.

The Standard Lock Co., Syracuse, N. Y., has increased its capital stock to $65,000.

The Regent Metal Goods Co., Buffalo, has leased space at the plant of the Lord & Burnham Co., St. Catherines, Ont., and will establish a works for the manufacture of bicycle coaster brakes.

A. H. Boyce, 160 East Avenue, Rochester, N. Y., has completed plans for a two-story machine shop, 64 x 195 ft., to cost $35,000 including equipment.

Plans are being prepared by the U. S. Roller Bearing Co., Ellicott Square Building, Buffalo, for a manufacturing plant to contain 40,000 sq. ft. The estimated cost is $100,000.

The Herschell-Spillman Co., North Tonawanda, N. Y., manufacturers of amusement park equipment, has plans prepared for an addition to its plant on Tremont Street.

The Elmira Foundry Co., Elmira, N. Y., will erect a factory building at Main and Woodlawn avenues to cost $200,000.

Pittsburgh

PITTSBURGH, Feb. 24.

The Duff Mfg. Co., Pittsburgh, Pa., manufacturer of automobile jacks, has filed plans for a one-story forge shop on Preble Avenue to cost about $25,000.

The Pittsburgh Reflector & Illuminating Co., 3117 Penn Avenue, Pittsburgh, is taking bids for its proposed new one-story plant, 70 x 100 ft., at Irwin, Pa.

The McKenna Brass & Mfg. Co., Pittsburgh, has acquired two pieces of property, each 21 x 84 ft., on Ross Street, for extensions.

The Phillips Tool Co., Mannington, W. Va., manufacturer of oilwell tools and equipment, is planning an addition to double its capacity.

The Chaplin-Fulton Mfg. Co., 28 Penn Avenue, Pittsburgh, manufacturer of steam fittings and supplies, has construction under way on a two and three-story addition, 15 x 110 ft., on Penn Avenue, to cost $35,000.

The Gilmore Mfg. Co., Charleston, W. Va., has been incorporated with a capital stock of $500,000 by John R. Hays, George W. McClintic and W. H. Truslow to manufacture automobile bodies.

The West Virginia Metal Products Co., Fairmont, W. Va., has arranged for a capital stock issue of $2,500,000. It is now building a local plant for brass and copper sheets, plates, rods, wire, etc., estimated to cost $1,000,000. It is proposed to develop a capacity of 80,000 lb. finished brass and 20,000 lb. finished copper per day. J. E. Watson is president.

The Mountain State Electric Co., Charleston, W. Va., has been incorporated with a capital stock of $100,000 by R. S. White, H. R. Sapp and Fred O. Blue, to establish and operate an electric power plant and system.

The American Thermos Bottle Co., 35 West Thirty-first Street, New York, with plant in Connecticut, is having plans prepared for its proposed plant at Huntington, W. Va., estimated to cost over $2,000,000 including equipment. William B. Walker is president.

The Globe Brick Co., East Liverpool, Ohio, recently or-

ganized, is planning for a new refractory and firebrick manufacturing plant at Kenilworth, W. Va. The initial works will comprise a main building, 40 x 340 ft., and smaller structure, 40 x 50 ft. Dry presses, dry pans and other machinery will be installed, most of the equipment to be motor-driven. Fred G. Porto is president and general manager.

The American Fishing Tool Co., Parkersburg, W. Va., is considering plans for a new one-story boiler plant on Depot Street.

The Ohio Valley Enameling Co., Huntington, W. Va., is planning a plant addition for the manufacture of enameled ware to cost about $50,000. The machinery installation is estimated to cost close to $75,000.

The Ohio Generator Co., Wheeling, W. Va., has been organized with a capital stock of $100,000 by E. M. Roudebaugh, G. S. Houston, Peter Lloyd, Elmer H. Rose and Ralph R. Miller.

The past week has seen the incorporation of a new Central Pennsylvania iron concern. The Carlisle Foundry Co., Carlisle, Pa., has been incorporated with a capital stock of $50,000, by Caleb S. Brinton and Thomas McDonald, Carlisle, and N. C. Righter, Columbia. Plans have not yet been made public.

The Anderson Motor Co., York, Pa., in order to care for increasing business, is planning additions to its factory. Seven adjoining properties have been purchased to furnish the site. Work will start about April 1.

Baltimore

BALTIMORE, Feb. 23.

The Caroline Foundry Co., 723 South Caroline Street, Baltimore, iron and brass founder, has awarded contract to the Chesapeake Iron Works, Westport, Baltimore, for a one-story brick addition, 60 x 106 ft., to cost $10,000.

The Baltimore Valve Co., Sinclair Lane and the Baltimore & Ohio Railroad, Baltimore, which plans to establish a plant, has been incorporated with 1500 shares common stock without par value and 1000 shares preferred stock, par value $100. It will manufacture iron, brass and steel castings, engines, machinery, etc. The incorporators are Alan P. Smith, Ferdinand F. Rob and James H. Preston.

The Poole Engineering & Machine Co., Woodberry, Baltimore, plans to begin the manufacture of washing machines in the near future. The equipment has been contracted for.

The buildings vacated by the Black & Decker Mfg. Co., at 105 to 115 South Calvert Street, Baltimore, with the equipment of the special machinery department, has been taken over by the Dieffenbach-Westendorf Mfg. Co., which has been incorporated with $80,000 capital stock. The new company will continue the manufacture of special machinery of all kinds. Otto W. Dieffenbach, formerly secretary Black & Decker Co.; John W. Westendorf, formerly shop superintendent for the company, and George M. Kimberly, the treasurer, are the incorporators. It is announced that Mr. Kimberly will continue as treasurer of both companies.

The Electromechanical Co., 530 North Calvert Street, Baltimore, is planning to occupy a four-story building at Calvert and Franklin streets, which is being remodeled. W. D. Young is president.

Fire, Feb. 15, destroyed the plant and machinery of the Peerless Fertilizer Co., Chestertown, Md. The damage is estimated at about $175,000. Wilbur W. Hubbard is president, and D. B. Strong, secretary.

New equipment has been contracted for by the Baltimore Tube Co., 1000 Wicomico Street, Baltimore, to be in operation by May 1. The new sheet brass mill was erected to accommodate equipment for the production of about 2,000,000 lb. per month running a day shift, and it became necessary to install additional equipment. C. S. Morse is president.

A new power plant to cost about $25,000 will be erected by St. Mary's College, Emmittsburg, Md. Frank J. Baldwin, 328 North Charles Street, Baltimore, is the architect.

The Eastern Rolling Mills Co., Lexington Building, Baltimore, is arranging for a stock issue of $2,000,000, to be used in part for plant additions now in course of construction. The present works are expected to be ready for service early in March, and the new extensions will include hot mills, annealing department, cold-rolling and finishing departments, pickling works, and other sections. The company will specialize in the manufacture of metal sheets for automobile production and kindred specialties. J. M. Jones is president.

To provide for its proposed plant and business expansion, officials of the C. D. Pruden Co., manufacturer of portable steel buildings, Warner and Dock streets, Baltimore, has filed articles of incorporation under the name of the C. D. Pruden Corporation, with a capital of $500,000.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is considering tentative plans for its proposed new electric power plant at Dundalk. The project will comprise about four units, each of which will be constructed at different intervals.

The Southern Cotton Oil Co., Hopewell, Va., is considering plans for a new plant in this vicinity. Southern headquarters are at Atlanta, Ga. L. W. Haskell is vice-president.

The Norfolk Shipyards Corporation, Norfolk, Va., recently incorporated with a capital of $500,000, has plans under way for a local shipbuilding plant. A site of 50 acres with water frontage has been acquired, and plans being prepared for 20 shop and construction buildings with two drydocks. The structures will include machine shop, foundry, wood-working plant, power plant. A marine railway will also be installed. Benjamin Lowenberg is president; S. Lloyd Drake, vice-president, and David L. Lowenberg, treasurer.

The Machinery & Hardware Co., Wake Forest, N. C., has been incorporated with a capital stock of $50,000 by R. J., W. F. and H. P. Jones, to manufacture machinery and general metal products.

The Alleghany Motor Co., Cumberland, Md., is planning for a service and repair plant. It was recently incorporated with a capital of $100,000, and will devote a large part of activities to parts manufacture. Charles Allen, Daniel P. Cubbage and Edwin F. Stahl head the organization.

The Atlanta Safe Co., Atlanta, Ga., has been incorporated with a capital of $20,000 by C. C., W. H. and A. A. Downs, to manufacture safes and metal cabinets.

The Lynchburg Air Service Corporation, Lynchburg, Va., recently incorporated with a capital of $25,000, is planning a plant for manufacturing airplane parts, general repair and machine work. L. A. Myers is president, and William T. Macloed, secretary.

The King Electric Washing Machine Co., 217 West Saratoga Street, Baltimore, has been incorporated with $100,000 capital stock by Maximilian V. Mueller, Charles L. Houck, William J. Baeschke, Charles C. Schaefer and William J. Stein.

The Cameron Stove Co., Richmond, Va., plans to erect a foundry building.

Prices on can-closing machinery are wanted by the Badin Motor Co., Badin, N. C.

The Peerless Tool Co., Charleston, S. C., has been incorporated with $100,000 capital stock by N. L. and J. G. Isenhour.

John, James A. and John Z. Rourke, Savannah, Ga., have incorporated the Rourke Dry Docks Co., with $50,000 capital stock.

The Cowan-Alford Boring Machine Co., Birmingham, Ala., has been incorporated. W. V. Alford is secretary and treasurer.

The Birmingham Slag Co., Birmingham, Ala., is planning for the erection of a new crushing plant to cost about $150,000. The installation will include cranes, steam shovels, etc. H. Glenn Ireland is general manager.

Chicago

CHICAGO, Feb. 23.

The market has apparently recovered from the lull which followed the recent price advances, although reports of sellers regarding the rate of current business are by no means uniform. Some dealers assert that inquiries and orders are as numerous as in January, which was a record month; others note an increased hesitancy on the part of consumers, particularly the larger ones, to buy except for early shipment. On the other hand, implement manufacturers and railroad car builders are said to be taking a keen interest in the market, although in a quiet way. A manufacturer of wheels for agricultural machines recently scoured this market and those in cities farther east for immediate needs. A large local interest is in the market for six boring mills for prompt delivery.

The sale of Government tools in this district seems to have become more of a factor in the market than heretofore, probably because of the extended deliveries on some lines of new equipment. A recent weekly bulletin published by the Chicago District Salvage Board of the Ordnance Department contains a long list of tools at the storage depot. It is prefaced by an announcement that tools will be sold to the first bidder submitting a price considered by the Government to be a fair value, that bids are opened as soon as received and that no deposits are required.

In the new equipment field the price situation continues strong. Two tool manufacturers have advised local dealers that no future business will be accepted except on the basis

of prices ruling at time of shipment. This move indicates either confidence in an uninterrupted upswing in prices or a desire to discourage further additions to their heavy bookings. Perhaps both considerations influenced the decision. While the industry need not worry about orders for many months the possibility of foreign competition at a later date must not be overlooked. Within the past week local dealers have been approached by representatives of tool manufacturers abroad who desire agencies in this country. Although these makers have little to offer for better than seven months' delivery, their emissaries report they have taken a number of orders since arriving in the United States, notwithstanding the fact that they have made no effort to sell.

The Schlitz Brewing Co., Milwaukee, is constructing a large food products plant in that city for which it purchased about $30,000 worth of machine tools.

The Doehler Die Casting Co., Brooklyn, New York and Toledo, is building a plant, 160 x 330 ft., in this city which will employ 500 people. It recently purchased seven acres, including the site of the plant, in the Burnside industrial district, and expects eventually to cover the entire tract with manufacturing facilities, at which time the number employed will exceed 2000.

The Universal Battery Co., 3410 South La Salle Street, Chicago, has purchased a tract, 120 x 165 ft., on Wentworth Avenue, near Thirty-fifth Street, on which it will build a two-story plant to cost $100,000.

The Morton Master Board Corporation, Rockford, Ill., has been incorporated to manufacture textile drying apparatus and general sheet metal work at 250 Mill Street. The capital stock, amounting to $25,000, is held by G. O. Morton, Rockford; F. A. Tanner, Harvard, Ill., and E. B. Manley, Rockford. The company has taken over the business of G. O. Morton.

The Buckeye Drill & Lathe Co., Columbus, Ohio, has purchased the plant of the Simplex Tool Co., Richmond, Ind.

The Griffin Wheel Co., Chicago, manufacturer of car wheels, will erect a $2,000,000 plant in Council Bluffs, Iowa, on a 9-acre tract on the Union Pacific Railroad, near Twenty-seventh Street.

The Russell Grader Mfg. Co., Minneapolis, will build a new plant on Kennedy Street, near Stinson Boulevard. The main structure, 424 x 600 ft., will cost $500,000 and will employ 1000. The present plant at 2005 University Avenue, S. E., will be disposed of.

Ralph J. Bloomer, engineer of Nobles County, Minn., has resigned, and will leave his present residence, Pipestone, to move to St. Paul, where he will open a factory for the manufacture of a motor-driven dump wagon, upon which he recently secured a patent.

The Rockford Malleable Iron Works, Rockford, Ill., has awarded a contract for the construction of a new core room, 44 x 52 ft.

The Standard Steel Casting Co., 910 South Michigan Avenue, Chicago, has awarded a contract to W. L. Archibald, 111 Washington Street, for the erection of two one-story additions at 5933 West Sixty-sixth Street, 70 x 250 ft., to cost about $200,000, including equipment.

Fire, Feb. 7, destroyed a portion of the plant of the Co-operative Machinery & Tool Co., Minneapolis, Minn., with loss reported at $75,000.

The Fruin Drop Forge Works, 349 Root Street, Chicago, has completed plans for a one-story forge shop addition, 50 x 50 ft. J. L. Fruin is president.

The Zonta Tire & Rubber Co., Sioux City, Iowa, is having plans prepared for a one-story and basement plant, 154 x 154 ft., for the manufacture of tires, to cost about $80,000. C. W. Summer, Sioux City, is the architect.

J. Downey, Sigourney, Iowa, is having plans prepared by O. H. Carpenter, architect, Iowa City, for a one-story machine shop, 36 x 130 ft., to cost about $30,000.

The Garden City Spring Works, 2300 Archer Avenue, Chicago, has awarded a contract to Strandberg Brothers Co., 19 South La Salle Street, for a two-story addition, 75 x 120 ft., to cost $40,000.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Street, Chicago, is taking bids for a one-story addition, 47 x 124 ft., to cost $20,000.

A. F. Pashley, architect, 431 South Dearborn Street, Chicago, has taken bids on a one-story plant, 120 x 120 ft., to be erected at 2430 Fulton Street for the George W. Moore Co., manufacturer of mill supplies, 2144 Fulton Street. It will cost $60,000.

The Pullman Co., 79 East Adams Street, Chicago, has let contracts to the E. W. Sproul Co. for a one-story factory, 46 x 159 ft., and a one-story press building, 60 x 170 ft., on Erickson Avenue, near East 104th Street. The aggregate cost is $160,000.

The Slingerland Correspondence School of Music, 616 South Michigan Avenue, Chicago, is asking for bids through an architect on a two-story building, 86 x 120 ft., to be erected at 349 to 355 North Central Park Avenue. Part of the building will be used for a music school and the remainder for manufacturing musical instruments. It will cost $35,000.

L'Hommedieu & Sons, 4521 Ogden Avenue, Chicago, manufacturers of platers' and polishers' supplies, have awarded a contract for the construction of a three-story addition, to cost $50,000.

The Hy-Speed Wrench Co., 2614 West Forty-eighth Street, Chicago, has let contracts for the erection of a one-story plant, 125 x 125 ft., to be erected at its present location at a cost of $38,000.

The Republic Flow Meter Co., manufacturer of meters, 565 West Washington Street, Chicago, has let contract for the erection of a two-story plant, 75 x 125 ft., at 2801-13 North Oakley Street, to cost $80,000.

The Continental Can Co. has leased 40,000 sq. ft. of manufacturing space at 2219-39 South Halsted Street, Chicago.

The Leonard Tractor Co., manufacturer of farm tractors, Gary, Ind., has bought 106 acres at Griffith, Ind., five miles south of Hammond and three and one-half miles southwest of Gary. A $200,000 one-story steel structure, 100 x 250 ft., will constitute the first unit of the manufacturing facilities contemplated.

The Nachman Co., and two affiliated companies, manufacturers of spring seat cushions for automobiles, 2025 South Clark Street, Chicago, have leased a plant at 2231 South Halsted Street. The building contains 123,000 sq. ft. of floor space.

The Accessories Mfg. Co., manufacturer of electric specialties, 412 Orleans Street, Chicago, will build a two-story plant in North Crawford Avenue, near Fullerton Avenue, to cost $48,000.

The A. P. Harder Furnace Co., Rockford, Ill., has been incorporated with $300,000 capital stock to manufacture smokeless heating furnaces. The incorporators include A. P. Harder, C. F. Henry and Howard J. Bannen.

The Furst McNess Co., manufacturer of machinery, Freeport, Ill., has increased its capital stock from $200,000 to $500,000.

The International Earth Boring Co., Otis Building, Chicago, manufacturer of machinery for setting telephone poles and caterpillar tractors, has purchased an 18-acre tract south of the Winther Motor Truck Co. plant, Kenosha, Wis., and will construct a plant, 130 x 280 ft.

The Woodford Engineering Co., 118 North La Salle Street, Chicago, contemplates the construction of a two-story machine shop, 44 x 122 ft., to cost $75,000.

The Standard Steel Casting Co., 910 South Michigan Avenue, Chicago, contemplates the erection of two one-story structures, each 70 x 250 ft., estimated to cost $200,000.

The Power Equipment Co., 343 South Dearborn Street, Chicago, contemplates the erection of a one-story plant, 124 x 150 ft., to cost $75,000.

Cleveland

CLEVELAND, Feb. 23.

The demand for machinery continues fairly heavy although there has been some falling off in small lot inquiries the past two weeks. New inquiries include one from the Detroit Gear & Machine Co., Detroit, for over 100 machines for extensions and one from the Otis Steel Co., Cleveland, for 12 to 15 machines to enlarge its shop capacity necessitated by the construction of a new sheet mill. The Packard Motor Car Co., Detroit, placed 30 screw machines and Henry Ford & Son 23 screw machines for their tractor plant at Hamilton, Ohio. Another order placed with a Cleveland maker the past week was for 31 screw machines from the Columbia Graphophone Co., Fitchburg, Mass. The White Co., Cleveland, bought two large turret lathes. A good volume of business continues to come from Akron tire manufacturers and allied interests. The Goodyear Tire & Rubber Co. has taken bids for a round lot of presses for its new rim plant, but it is possible that the purchase of a part of this equipment will be deferred because of the scarcity of rim-making steel.

The Detroit Gear & Machine Co., Detroit, Mich., has issued a list of about 115 machines for an extension and for its tool room. It includes six radial drills; ten screw machines; four 24-in. drilling machines; three 18-in. x 6-ft. lathes; six spline grinders; five single-spindle sensitive drills; four multiple-spindle drilling machines; four 21-in. drilling machines; four 24-in. drilling machines with tapping attachments; four hydraulic straightening machines; three 24-in. and four 21-in. double-spindle drilling machines, and

other machines in single items or lots of two, including grinding, drilling, and cut-off machines, lathes, broaching machines, drill grinders, vertical boring machines, etc.

The Domestic Electric Co., Cleveland, manufacturer of small electric motors, has acquired the plant of the Vahan Products Co., St. Clair Avenue and East Seventy-third Street, which it will shortly place in operation to increase its capacity. The company will retain its present quarters in the Whitney Power Block. Carl Duffner is president, and A. N. Kellogg, secretary and treasurer.

The Redding Steel Products Co., 1519 East Thirty-second Street, Cleveland, is building a one-story plant, 60 x 90 ft., at 7708 Quincy Avenue. It is now engaged in machine work but will bring out a small precision drilling machine. J. C. Norton is president; L. B. Heitzig, secretary; Arthur A. Locke, general manager. The company was organized about three months ago and has increased its capital stock from $25,000 to $250,000.

The Draper Mfg. Co., Cleveland, has placed a contract through the W. S. Ferguson Co., architect and engineer, for the first unit of a new plant to be erected at Etna Road and East Ninety-third Street.

The Brown Body Corporation, Cleveland, will shortly begin the erection of a $350,000 plant for the manufacture of automobile bodies, trucks and fire apparatus. A site has been acquired on the Big Four and Wheeling & Lake Erie railroads, and the plant will include a three-story building, 60 x 260 ft., with an L 60 x 170 ft. and a saw-tooth type structure, 110 x 170 ft. Contract has been placed with the S. K. Ferguson Co., Cleveland. Paul J. Brown is president and John H. Price, secretary.

The Port Arthur Shipbuilding Co., Port Arthur, Ont., has taken bids for about six machines for its shop at Port Arthur, and has a new inquiry for a plate planer with a capacity to plane 1½-in. plates 28 in. wide at one setting. N. S. Thrasher, Rockefeller Building, Cleveland, is the purchasing agent.

The Buckeye Brass & Mfg. Co., 6410 Hawthorne Avenue, Cleveland, is having plans prepared for two buildings, 75 x 75 ft., and 30 x 110 ft., respectively, to be used for a furnace room and foundry.

The Paragon Motor Car Co. is planning to build works at Connellsville, Pa., and has opened engineering offices in the Century Building, Cleveland. It expects to be in the market in about 60 days for equipment for an assembling plant.

The Auer Register Co., Cleveland, has placed contract for a two-story plant to be erected at East Thirty-seventh Street and Payne Avenue.

The Thew Shovel Co., Lorain, Ohio, has been incorporated as a step in the reorganization of the Thew Automatic Shovel Co., manufacturer of steam shovels. Plans are being prepared for an expansion of its business and new buildings will be erected, increasing the floor space 60 per cent. The new company will have an authorized capital stock of $1,000,000 preferred and 15,000 shares of no par value common stock. Robert Thew, who has been actively associated with the company since its organization and at present a director, will retire.

The Reynolds Machine Co., Massillon, Ohio, has increased its capital stock from $200,000 to $500,000, to provide funds for the manufacture of tire molds.

The Erie Tire & Rubber Co., Sandusky, Ohio, is inquiring for five vertical boring mills, 48 x 72 in., and five horizontal boring mills, 30 x 50 in.

The Napoleon Machine & Tool Co., Napoleon, Ohio, recently organized, has elected W. D. Hummer, president; Charles M. Rasche, vice-president and factory manager; S. A. Craven, secretary, and A. Daman, treasurer.

The Federal Radiator Co., Zanesville, Ohio, recently incorporated, will begin the erection of a plant about April 1.

The Bucyrus Iron Co., Bucyrus, Ohio, recently incorporated with a capital stock of $125,000, will shortly begin the erection of a plant, 70 x 200 ft. No announcement has been made as to its line of products.

The Garford Co., Lima, Ohio, has placed a contract for an assembling and stock building, one-story and basement, 100 x 420 ft.

The Cree-Becker Oil Tool Co., Newark, Ohio, has been incorporated with a capital stock of $500,000 by J. A. Cree and others, and is a consolidation of the Ureka Machine Tool & Supply Co., Winchester, Ky., in the interests of J. A. Cree, Utica, Ohio. It will manufacture drilling tools for gas, oil and artesian wells.

The Moore Tool & Machine Co., Newark, Ohio, has placed a contract for an addition, 120 x 120 ft.

The plant of the Alliance Brass & Bronze Co., Alliance, Ohio, was damaged by fire a few days ago, the loss being estimated at $15,000.

The Seneca Wire & Mfg. Co., Fostoria, Ohio, has acquired a site on which it plans to build an extension which will eventually triple its present capacity.

Contract for a reinforced concrete addition, 125 x 175 ft., four stories and basement, for the Diamond Match Co., Barberton, Ohio, has been awarded to the Turner Construction Co. Other work includes two stories on an existing building. The entire project is estimated to cost approximately $475,000 and is in charge of H. F. Hallock, engineer for the Diamond Match Co.

The National Cash Register Co., Dayton, Ohio, has taken out a permit for the erection of a factory to cost $17,000.

Detroit

DETROIT, Feb. 23.

The Federal Bearing & Bushing Corporation, 364 Trumbley Street, Detroit, has authorized Esselstyne, Murphy & Hanford, architects, Marquette Building, to prepare plans for its proposed new plant in the Terminal Railroad section.

I. Applebaum, 2023 Dime Bank Building, Detroit, manufacturer of railroad equipment, etc., has completed plans for a new three-story plant, 76 x 180 ft., on Russell Street, to cost about $100,000.

The Enterprise Foundry Co., 1127 Griswold Avenue, Detroit, will build a two-story addition, 35 x 40 ft., on Theodore Street.

The Clark Equipment Co., Buchanan, Mich., manufacturer of drills and other cutting tools, is having plans prepared by Billingham & Cobb, Telegraph-Press Building, Kalamazoo, Mich., for the erection of two manufacturing buildings, 100 x 120 ft., on Springfield Place, Battle Creek, Mich.

The Novo Engine Co., Lansing, Mich., has arranged for the immediate erection of a two-story addition, 120 x 200 ft., to be equipped as a machine shop and foundry, estimated to cost $200,000, including equipment. It specializes in the manufacture of gas and gasoline engines.

The Ruggles Metal Products Co., Grand Rapids, Mich., has completed plans for the erection of a new plant at Iona Avenue and Stevens Street.

The American Electrical Heater Co., 1351 Woodward Avenue, Detroit, manufacturer of electric heating and cooking appliances, has had plans prepared for the erection of a two-story and basement plant, 30 x 130 ft., on Conner Avenue, Hamtramck, Mich.

The Federal Drop Forge Co., Lansing, Mich., is planning for the immediate construction of a one-story addition, 60 x 120 ft.

The Industrial Foundry Co., St. Johns, Mich., has recently doubled its output and will increase its capital stock to provide additional manufacturing facilities and improvements. John Spousta is manager.

The Transport Truck Co., Mount Pleasant, Mich., has increased its capital stock from $1,000,000 to $5,000,000. All of the new stock will not be offered for sale but a portion will be used to take care of expansions.

The King Motor Car Co., Detroit, will erect new works on a site east of the River Rouge, recently acquired by Artemas Ward, New York, majority stockholder. The property has railroad facilities being flanked by the tracks of the Michigan Central and the Lake Shore & Michigan Southern.

A number of industrial plants at Flint, Mich., have commenced the erection of additions, setting a new record for building construction in this city. Among the projects are the construction of nine new plant units for the Buick Motor Car Co., estimated to cost over $7,000,000, including equipment. The Chevrolet Motor Co., the Flint Motor Axle Co., Champion Ignition Co., Dort Motor Car Co., W. F. Stewart Co., manufacturer of automobile bodies, and the Marvel Carburetor Co., are other industries that have commenced enlargements.

The General Aluminum & Brass Mfg. Co., East Grand Boulevard, Detroit, is planning for the immediate erection of a one-story building at Marysville, Mich., 350 x 450 ft., to cost about $75,000. F. C. Root is vice-president.

The Fuller & Son Mfg. Co., North Pitcher Street, Kalamazoo, Mich., manufacturer of gears for automobiles, has broken ground for a four-story addition, 50 x 140 ft., at Pitcher and Prouty streets. W. H. Fuller is president.

Cincinnati

CINCINNATI, Feb. 23.

A noticeable falling off in inquiry has been apparent the past week. This is accounted for by some manufacturers by the fact that buyers bought heavily before the recent

price advances, as most firms allowed 10 days to elapse between the time of announcement of new prices and their going into effect. The principal inquiry before the trade the past week was from the Honolulu Iron Works for complete equipment for a machine shop to be erected at Honolulu, H. I. The list comprised planers, engine lathes, crankshaft lathes, boring mills and other tools and totaled about $100,000. So far as can be ascertained, none of the tools sought by the Nickel Plate Railroad have been purchased. The Missouri, Kansas & Texas Railroad, which was recently in the market for tools, has, it is understood, withdrawn its list. Oil companies were the chief buyers during the week, though a number of orders for one to two machines were received from automobile plants.

The Welland Press & Tool Co., Cincinnati, has purchased the controlling interest in the Middletown Machine Co., Middletown, Ohio, manufacturer of woodpecker gas engines, and will continue the business.

The General Woodworking Co., Cincinnati, has been incorporated with a capital stock of $75,000 to take over the automobile body and wood-working business heretofore operated under the same name. T. M. Remke, F. H. Knoblaugh, Bernard Pellman, J. M. Helferich and J. M. Walsh are the incorporators.

The Bryan Screw Machine Products Co., Bryan, Ohio, has recently increased its capitalization from $150,000 to $200,000. It is understood the additional capital will be utilized in purchasing new equipment.

The Dimler-Himes Co., Dayton, Ohio, manufacturer of tools, dies and fixtures, has increased its capital stock from $20,000 to $150,000 and has purchased property on Third and Minerva streets for $20,000. It is understood that the company has an option on the plant of a Cincinnati machine-tool concern, and should the deal go through will manufacture that product in Dayton. W. J. Dimler is president and general manager.

The Lunkenheimer Co., Cincinnati, has purchased additional ground at Hartwell for $150,000 and will make some changes in its original plans for its new plant. Bids will be asked for the erection of the iron foundry, the first section of the new plant, early in March. Frank Chase, Chicago, is the architect.

The Dayton Friction Toy Co., Dayton, Ohio, has been incorporated by C. W. Dale and W. B. Wright with a capitalization of $175,000 to manufacture mechanical toys.

The Columbus Malleable Iron Co., Columbus, Ohio, will build an extension to its plant on Curtis Avenue, to cost $4,500. Work will start immediately.

The Pres-Steel Mfg. & Enameling Co., Cincinnati, has been incorporated with a capital stock of $75,000 by H. N. Strauss, A. F. Lavercombe, G. C. Ebersole, M. E. Little and F. A. Heitzman. No details of the plans have been given out.

The Harlan Electric & Machine Works, Harlan, Ky., has been incorporated with a capital stock of $75,000 to manufacture electrical goods and small machine tools. A. C. Jones, G. H. Black and F. C. Tarvin are the incorporators.

The Buckeye Drill & Lathe Co., Columbus, Ohio, recently incorporated with a capital stock of $300,000, has purchased the plant of the Simplex Machine & Tool Co., Marion Road, for a consideration said to have been $70,000. The Buckeye company has also taken over the Simplex plant at Richmond, Ind.

The Safety Foot Guard & Railway Appliance Co., Columbus, Ohio, has under consideration the erection of a plant, work to begin in the spring. It manufactures railroad safety appliances, under contract with the Buckeye Steel Castings Co., and has offices in the Hartman Building. James C. Nicholson is president.

The Tennessee Stave & Lumber Co., Oneida, Tenn., is planning for the erection of a new band mill with a daily capacity of about 40,000 ft. The machinery is estimated to cost $30,000. The company recently increased its capital from $500,000 to $750,000. O. H. Anderson is general manager.

The Newburger Cotton Co., Memphis, Tenn., is planning for the erection of a new cotton compress plant to cost about $100,000, including equipment. Will have a capacity of 10,000 bales.

The Louisville & Nashville Railroad Co., Louisville, Ky., is planning to rebuild its machine and repair shops at Paris, Tenn., recently destroyed by fire with loss estimated at $50,000.

The Eureka Brass Co., recently organized with a capital stock of $60,000, has leased the three-story building at 121 Canal Street, Cincinnati, and will commence operations as soon as alterations have been completed.

The Cincinnati Steel Castings Co., which recently increased its capitalization to $100,000, is building an addition to its molding department. It is understood that the company will acquire additional property and install an electric furnace.

The Wadsworth Electric Mfg. Co., Covington, Ky., has increased its capital to $150,000.

The Premier Tire & Rubber Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $300,000 by Roland E. Wright, Heber T. Pyke, Obed W. Markle and others to manufacture automobile tires, tubes and rubber goods.

Fire which started in the machine shop of the Greey Foundry Co., Church and Esplanade streets, Toronto, Jan. 26, damaged the building to the amount of about $15,000 and the machinery and contents about $50,000. The plant, which is owned by J. G. Greey and manufactures mill machinery, will be rebuilt immediately.

The Dayton Rubber Mfg. Co., Dayton, Ohio, is planning for the construction of a one-story and basement addition, 120 x 380 ft., to form a second unit at its works. The estimated cost is about $150,000.

The Ashley Railway Safety Tie & Construction Co., Willard, Ohio, has been incorporated in Delaware with a capital stock of $1,000,000 by Leonard W. Ashley, Willard; W. H. Rufmead and Andrew Foulds, Jr., Passaic, N. J., to manufacture railroad equipment.

The Turnbull Wagon Co., Defiance, Ohio, has arranged for a change of name to the Defiance Motor Truck Co. It is remodeling its works to devote the entire output to motor trucks and parts, discontinuing other lines of manufacture.

The Cincinnati Refrigerating Co., Lincoln Avenue, Cincinnati, manufacturer of ice and refrigerating equipment, is planning for the erection of a one-story plant, 80 x 200 ft., for the production of small ice-making plants for domestic service.

The building to be erected by the Sayers & Scovill Co., Gest and Summers streets, Cincinnati, manufacturer of automobiles, parts, etc., will be used as an assembling works. It will be three and four stories, 80 x 353 ft., and is estimated to cost $200,000.

Indianapolis

INDIANAPOLIS, Feb. 23.

The Martin-Parry Corporation, Indianapolis, which manufactures commercial and truck bodies for motor vehicles, has set aside $500,000 for extensions and establishing a bonus system for employees. It is planned to double the capacity of the works and about $100,000 will be spent in buildings. J. A. Callahan, in charge of production at the Indianapolis and York, Pa., plants, will have headquarters in the former city. F. M. Small, York, Pa., is president and R. P. Henderson, Indianapolis, vice-president.

The Lion Tire & Rubber Co., Lafayette, Ind., has increased its capital stock from $250,000 to $500,000.

The Trudeau Motors Corporation, Fort Wayne, Ind., has been incorporated with $75,000 capital stock to manufacture motors and gas engines. The directors are C. J. Lomont, Fred L. Miller and Guy Colerick.

The G. & R. Foundry & Machine Shops, Terre Haute, Ind., which recently bought the Crawford & McCrimmon plant at Brazil, Ind., is enlarging it and will employ 300 men.

The National Rolling Mill Co., Vincennes, Ind., is planning for the early erection of two one-story additions, each about 80 x 260 ft., of steel and concrete construction.

The Edison Lamp Works of the General Electric Co., Clinton and Holman streets, Fort Wayne, Ind., is taking bids for the erection of two two-story and basement additions, to cost about $200,000.

The Lion Tire & Rubber Corporation, Lafayette, Ind., has increased its capital stock from $250,000 to $500,000.

Huntington Steel Foundry Co., Huntington, Ind., has increased its common stock from $175,000 to $375,000 and preferred stock from $50,000 to $750,000.

The Common Council, Kendalville, Ind., has under consideration improvements to the municipal light and water plant, the cost of rebuilding and equipping the boiler house having been estimated at about $105,000.

At a meeting of the Columbus Machine Works, Columbus, Ind., the following officers were elected: President, J. R. Dunlap; vice-president and manager, F. P. Boyd; secretary-treasurer, J. H. Dunn; directors, Charles Dehmer and H. C. Deist.

The Perfection Side Windshield Co., Indianapolis, has bought a building at 2409-2411 N. Illinois Street, and will convert it into a factory. Charles F. Eckler is president.

The Champion Corporation, Hammond, Ind., which manufactures potato digging machines, has increased its capital stock to $300,000.

The Standard Mfg. Co., Richmond, Ind., manufacturer of gas engines and air compressors, has been bought by Eben Louck, C. W. Jordan and L. A. Hadley.

The Acme Aluminum & Brass Works, 420 South Harding Street, Indianapolis, manufacturer of aluminum and brass castings, will increase its capital stock from $40,000 to $200,000 and enlarge its plant. The new building will have 50,000 sq. ft. of floor space. Peter Lambertus is president.

Machinery for the manufacture of clay products for making window and plate glass is among the improvements contemplated in an expenditure of $100,000 by the Pittsburgh Plate Glass Co. at Elwood, Ind. S. E. Clark is superintendent. Contract for the first buildings has been let to S. H. Digel, Elwood.

The Helfrich Sawmill & Mfg. Co., Evansville, Ind., will erect a new mill to cost $100,000. Ground has been broken for it.

The Ripley Cultivator Motor Tractor Co., Aurora, Ind., has been organized and has leased a building which will be converted into a factory. Nathan M. Ward is president; John E. Demaree, vice-president; Omer P. Shock, secretary, and William P. Castner, treasurer.

The Cement Products Co., Worthington, Ind., has increased its capital stock from $10,000 to $50,000.

The Hall-Neal Furnace Co., Indianapolis, will build a factory at Capitol Avenue and Thirteenth Street, 60 x 200 ft., for the manufacture of furnaces. It will cost $25,000.

The Panic Proof Products Corporation of New York has bought the plant, at Gary, Ind., of the Central Metallic Door Co. Contemplated additions will cost $1,000,000.

The Leonard Tractor Co., with headquarters in Gary, Ind., will build a plant at Griffith, near Gary. It is capitalized at $2,000,000.

The Advance Casting Co., Goshen, Ind., has broken ground for the erection of a new one-story plant, 70 x 196 ft., for the manufacture of gray iron castings. It is estimated to cost $25,000. S. E. Schacht is president.

The Reedy Elevator Co., 1026 Kentucky Avenue, Indianapolis, manufacturer of passenger and freight elevators, is planning for the erection of a new plant on New Jersey Avenue, near Merrill Street, to cost about $50,000. D. V. Reedy is president.

The Indianapolis Power & Light Co., Indianapolis, has completed plans for a one-story addition to its power plant, to cost about $75,000.

The Marion Foundry & Machinery Co., Marion, Ind., has plans under way for the erection of four one-story additions to its plant. H. L. Earlywine is president. Hiram Elder, Custer Building, is architect.

The Dean Brothers Steam Pump Co., 323 West Tenth Street, Indianapolis, is completing plans for the erection of a two-story and basement addition, 50 x 125 ft., on West Tenth Street, to be equipped as a machine shop and for general manufacture. It is estimated to cost about $50,000.

The General American Tank Car Corporation, 111 West Monroe Street, Chicago, Ill., is completing plans for the erection of a one-story addition to its plant at East Chicago, Ind., 400 x 1000 ft., to cost about $1,000,000, including equipment.

The Decatur Industrial Association, Decatur, Ind., announces that a foundry will be built in that city to make castings for the General Electric Co.'s plant, now being erected. It will employ 400 people.

The Rapid Rim Co., Huntington, Ind., has increased its capital stock from $500,000 to $5,000,000.

The Reliable Mfg. Co., Indianapolis, has been incorporated with $50,000 capital stock, to manufacture metal products. The directors are George M. Wolpe, Edward J. Kappeler and Charles Ritchel.

At the annual meeting of the Cummins Engine Co., Columbus, Ind., the following officers were elected: President, C. L. Cummins; vice-president, J. R. Dunlap; secretary, Ernest B. Sneider; treasurer, D. M. Bottorff.

The Anderson Trailer Co. has been incorporated at Anderson, Ind., with $25,000 capital stock, to manufacture automobile accessories. The directors are James W. Sansberry, George S. Parker and James S. May.

The Atkins Safety Automatic Gate Co., South Bend, Ind., has increased its capital stock from $100,000 to $200,000.

St. Louis

ST. LOUIS, Feb. 23.

The Willowbrook Brick & Tile Co., Willowbrook, La., F. M. Brown president, will equip a plant to cost about $100,000.

Crittendan & Snapp, Tupelo, Miss., are in the market for about $15,000 worth of cotton gin machinery.

The Crescent Tool Co., Tulsa, Okla., H. B. Hughes and others interested, will equip a plant to cost $100,000 for the manufacture of tools.

The Oklahoma Steel Castings Co., Tulsa, Okla., Ernest H. Cornelius and others interested, will purchase equipment for a foundry to cost about $100,000.

The Simons-Wiles Motors Co., Kansas City, Mo., LeRoy S. Simons, Richard E. Wiles and others interested, will equip a plant to cost $300,000.

The International Shipbuilding Co., Pascagoula, Miss., will change the equipment in its yard to build steel ships instead of wooden.

The St. Joseph Lead Co., St. Joseph, Mo., will build a new 5000 kw., steam-operated electric power plant at Leadwood, Mo., to cost in excess of $500,000.

The Tri-State Motor Co., Kansas City, Mo., is planning for the erection of a two-story service building and repair works, 71 x 103 ft., to cost about $50,000. E. G. Mura is president.

The American Range Co., East St. Louis, has acquired property at State and Twentieth streets and plans the erection of a new building for the manufacture of stoves, ranges, etc.

The Auto Chain Pull Co., Oklahoma City, Okla., has been incorporated with a capital stock of $200,000 by W. B. Smalling, Oklahoma City; E. E. Brown and J. K. Gauling, Sioux City, to manufacture automobile chains. The new company is planning for the erection of a local plant.

The Builders' Products Co., Lake Charles, La., is arranging for the erection of a new brick and tile manufacturing plant to cost about $100,000, including machinery.

The Capitol City Boiler Works, Baton Rouge, La., has been incorporated with a capital of $20,000 by William P. Cornell, Theodore Dupre and Sylvester Gros, to manufacture boilers, tanks, etc.

The St. Joseph Lead Co., 61 Broadway, New York, will equip a power house at Leadwood, Mo.

The Richland Light & Power Co., Richland, Mo., E. R. Woodward, president, will install 60 kw. three-phase, 60-cycle, 2300-volt alternators, fuel oil engine, ice plant equipment and other machinery.

The H. L. Hussmann Refrigerator & Supply Co., St. Louis, will equip an additional unit for the manufacture of refrigerator systems. About two acres of floor space will be utilized.

The Oklahoma Foundry Products Co., Enid, Okla., will equip a plant to cost about $85,000.

The Shreveport Producing & Refining Co., Shreveport, La., 522 Edward Street, will equip an oil pumping station of 10,000 bbl. capacity in connection with a pipe line.

William Green, Ged, La., is reported in the market for 24-in. centrifugal pumps for irrigation work at Carlyss, La.

The Safety First Truck Mfg. Co., Pawnee, Okla., will equip a truck manufacturing plant. Capital $300,000. F. S. and R. M. Porter and others interested.

The Deweese Rodgers Lumber Co., Philadelphia, Miss., is in the market for a 150 hp. high-pressure return tubular boiler and other power plant equipment.

The Consumers Ice & Light Co., Magnolia, Ark., is in the market for a 250 to 450 hp. Corliss engine direct connected to generator.

The Arkansas Hydro-Electric Development Co., 1107 Boyle Building, Little Rock, Ark., has completed plans for the first unit of its proposed hydroelectric plant on the Red River, and will soon call for bids for construction and equipment. It is estimated to cost about $320,000 and will be supplemented later by units to cost, complete, close to $5,000,000. E. T. Stanfield is vice-president and general manager.

Texas

AUSTIN, Feb. 21.

A. W. Glazier, Cisco, and associates will build a plant for the manufacture of motor trucks along special lines for transporting loads in the oil fields.

The Haring Cotton Machine Co., 911 Southwestern Life Building, Dallas, has under consideration plans for a building for the manufacture of a cotton-picking machine, the invention of P. P. Haring.

The Craven Oil & Refining Co., which is being organized with a capital stock of $2,500,000 by Capt. Leonard Wood, Jr., Jakehamon, and associates, has acquired a site for the erection of a 3000-bbl. refinery.

The Martin Wagon Co., Luling, has increased its capital stock from $75,000 to $125,000 and will enlarge its plant.

The Continental Oil Co. will rebuild its cotton-seed oil mill at Abilene which was recently destroyed by fire. The new plant will cost about $500,000.

The Seymour Producing & Refining Co., Seymour, will build a 2000-bbl. oil refinery and has awarded contract to the Refinery Construction Co. of Fort Worth, of which D. W. Beard is president.

J. O. Chapman and E. A. Dubose, Waxahachie, will build a cotton mill at San Antonio to cost about $500,000 and will establish an industrial town on the outskirts of the city

The Menard Light & Ice Co., Menard, has been incorporated with a capital stock of $30,000. The incorporators are A. E. Nauwald, Peter Anderegg and W. M. Bevans.

The North Texas Oil & Refining Co., which recently finished the construction of a 5000-bbl. refinery at Greenville, will build a plant of similar capacity at San Antonio on a tract of 30 acres south of the city, which it recently purchased.

The Weatherford Machine & Foundry Co., Weatherford, is enlarging its machine shop and foundry and will install considerable new machinery.

California

SAN FRANCISCO, Feb. 17.

The demand from domestic interests and the Orient for mining and milling machinery is very strong, many inquiries coming from the Dutch East Indies, Korea, Japan and also from South America. Local machinery business has been practically halted by the recent advance in prices. Dealers state the demand was good but it has almost disappeared with deliveries delayed from four to six months and the refusal of some manufacturers to name the price to be charged on delivery.

The Eno Tire & Rubber Co., 1026 South Los Angeles Street, Los Angeles, has acquired property at Boyle and Slausen avenues, for the erection of a tire manufacturing plant. It is proposed to build a number of units, the first to be one-story, 188 x 195 ft., of brick and concrete.

The Randall Control & Hydrometric Corporation, Los Angeles, has been incorporated with a capital stock of $500,000 by F. E. Trask, E. H. Seaver and W. H. and M. M. Hartman, to manufacture meters, elevator door controls and other mechanical devices.

The Pacific Steel Products Co., 527 Union League Building, Los Angeles, has filed notice of organization to manufacture iron and steel products. J. W. Van Dorn and W. C. Folsom head the company.

The San Joaquin Light & Power Corporation, Fresno, Cal., has perfected plans for the erection of an electric generating plant in the vicinity of Bakersfield, Cal. It will consist of several units, with total cost estimated at $6,000,000, including equipment. It is planned to inaugurate construction work on the first unit at once, to develop about 17,500 hp., and is estimated to cost about $900,000.

The Vallejo Electric Light & Power Co., Vallejo, Cal., has completed plans for the erection of a three-story addition to its power plant, to cost about $70,000.

The United States Compression Inner Tube Co., Tulsa, Okla., manufacturer of automobile casings and inner tubes, is considering plans for the erection of a new plant at Los Angeles. A site is now being selected for the initial unit, estimated to cost about $1,000,000 including equipment. The company is capitalized at $5,000,000 and maintains a local office in the Citizens' National Bank Building. M. C. Hale is president.

The Western Battery Mfg. Co., Los Angeles, has been incorporated with a capital stock of $50,000 by F. E. Sweet, V. T. Combs and William Kane, to manufacture electric batteries and other electrical equipment.

The Kelman Electric & Mfg. Co., Los Angeles, manufacturer of electric switches for high-tension lines, etc., has increased its capital stock to $100,000.

J. B. Odell, Perris, Cal., is organizing a company to build a cotton ginning plant in the Perris Valley, to cost about $50,000.

The California Automatic Hose Reel Co., 212 Commercial Street, Los Angeles, has been organized to manufacture mechanical and metal specialties.

The Wilhite Machine & Auto Works, Inc., Los Angeles, has been incorporated with a capital stock of $50,000 by Edwin C. Wilhite, Samuel C. Wilhite and Ferdinand Goode, Jr., to manufacture machine parts, and operate a general machine works.

A one-story machine shop, boiler plant and distillery works to cost about $25,000, exclusive of equipment, will be erected by the Los Angeles Soap Co., Los Angeles, on East First Street.

The Automotive Appliances Co., 412 Chamber of Commerce Building, Los Angeles, has filed notice of organization to manufacture metal products. Franklin Heywood heads the company.

Canada

TORONTO, Feb. 23.

The National Farming Machinery, Ltd., Montmagny, Que., which recently took over the plant and business of the General Car & Machinery Works, Ltd., will spend about $1,000,000 on extensions and equipment. It will continue the manufacture of steam engies, boilers, saw-mill, wood-working and road-making machinery, and will operate steel, iron, brass and aluminum foundries. In addition agricultural implements and gasoline engines will be made. A small rolling mill in connection with the steel foundry is also being erected.

Moirs, Ltd., Bedford, N. S., whose sawmill and wood-box factory was destroyed by fire last November, will rebuild immediately, the new plant to be 60 x 160 ft., two stories. All equipment will be motor driven.

The Torrington Co., Ltd., Upper Bedford, Que., manufacturer of knitting machine needles, etc., has purchased the property of the Bedford Stove Co. It is the intention to demolish the present buildings and erect a new factory in the spring to manufacture other lines which it is making in the United States, including screws, rivets, electric vacuum cleaners, and other appliances.

McKinnon Industries, Ltd., St. Catharines, Ont., will build an addition to its forge shop 50 x 70 ft., for the production of automobile drop forgings, gear forgings, rolled gears, etc.

The Norwood Engineering Co. of Canada, Ltd., the Canadian branch of the Norwood Engineering Co., Florence, Mass., has disposed of its plant at Cowansville, Que., to the Colonial Machinery Co., and has transferred its office to 71A St. James Street, Montreal. The Norwood company purchased the Cowansville factory in 1914 with the intention of manufacturing mechanical filtration plants and paper mill machinery, but owing to the war it did practically nothing along these lines. The Norwood Engineering Co. has arranged with the Colonial Machinery Co. to maufacture part of its products.

The Jenckes Spinning Machine Co., Pawtucket, R. I., has secured a site at Drummondville, Que., and will start work soon on the erection of a five-story manufacturing plant to cost about $1,000,000. An additional $1,000,000 has been set aside for equipment.

The Wood Hydraulic Hoist Co., Detroit, has purchased five acres at Tecumseh Road and Marentette Street, London, Ont., and will erect a subsidiary plant for the manufacture of its product.

Joseph Sulley, 618 Brock Avenue, Toronto, has had plans prepared for the erection of an addition to his brass foundry.

B. H. Prack, 50 Bay Street, Toronto, has been appointed architect by the Brunswick-Balke-Collender Co. of Canada, Toronto, for the erection of a $200,000 factory at Woodstock, Ont.

Hugh Walker, 230 Langley Avenue, Toronto, has the general contract for the erection of a factory to cost $8000 for the Guide Motor Co., 3 Berti Street, Toronto.

The factory owned by the St. Lawrence Welding Co., 138 Inspector Street, Montreal, was destroyed by fire with a loss of $35,000.

The Tube Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by Herbert W. Carter, 9 Sheppard Street; Peter M. Sorley, 153 Briar Hill Avenue, and others to manufacture tubes, machinery, etc.

Machinery & Foundries, Ltd., Brockville, Ont., has been incorporated with a capital stock of $250,000 by James G. Gardner, George E. Purkis, Joseph R. A. Laing and others. It will start work in the spring on the erection of a manufacturing plant at Brockville.

The Detroit Gartley-Weston Co., manufacturer of metal plating, etc., will establish a plant in London, Ont., to employ about 500. The officers are Robert I. Towers, Sarnia, Ont., president; P. C. Gartley, Detroit, vice-president; Malcolm McKenzie, Sarnia, Ont., vice-president and treasurer; Frank J. Weston, Detroit, secretary; James F. Perkins, Detroit, production engineer.

The Anglo-Canadian Metals, Ltd., 52 Spadina Avenue, Toronto, is in the market for one No. 6 Becker or No. 4 Cincinnati milling machine, also a 10 x 50-in. Norton grinder.

Charles Picot, Box 347, Meaford, Ont., is in the market for a 30-hp. oil engine.

The Canadian Wood Products, Ltd., 1000 Gerrard Street East, Toronto, is in the market for a generator, three-phase, 25-cycle, 500 volts, 75 to 100 kw., with switchboard.

W. H. Banfield & Sons, Ltd., 386 Pape Avenue, Toronto, is in the market for two Barber Colman gear hobbing machines, new or second-hand, No. 2 or No. 3, or other similar machines. It is also in the market for various sizes and gages of cold rolled, open hearth or Bessemer strip steel and round screw stock rods.

Morely & Smith, Windsor, Ont., are in the market for a Reynolds tire bolter and cutter; tire bender, 4 x 1 in.; helve hammer, 3-in. round; 2 spindle emery stand, 1-in. eye.

New England

BOSTON, Feb. 23.

No let up in the demand for machine tools is noted. Not only has a large amount of business been booked the past week, but the market is flooded with inquiries for one, two and up to six machines, in addition to several large lists. Inquiry covers a wide range of tools and comes from all parts of New England. Indications are that the gross value of orders booked this month will not only greatly exceed that for February, 1919, but will equal sales for last January, which was the best month, probably, in the history of the industry in this section.

Deliveries are extremely bad. None of the leading machine tool houses will specify dates except in special cases where large expenditures are involved, and even then not within three months. One dealer billed a Cincinnati machine last November for a Worcester buyer which has not yet reached its destination. Other instances noted are for tools which have been on the road a month or longer. Very little freight is coming into New England. The Boston & Maine Railroad in its Boston yards has 2100 cars to move and its daily capacity is 300. The Boston & Albany's local freight situation is not quite so bad, but that of the New York & New Haven is considerably worse. Because of their inability or lack of desire to move cars on sidings, etc., the railroads have notified many consignees that no demurrage charges will be made.

Machine tool prices continue strong with the tendency upward. Within the last week or 10 days some milling machines, radial drills and shapers have been advanced approximately 10 per cent, without checking the demand. Manufacturers of miscellaneous tools have notified local representatives that price changes will go into effect March 1 unless something unforeseen prevents. The demand for second-hand tools is increasing and good prices are obtained. The Government has cleaned up a large portion of its equipment stored in Springfield, Mass., which has helped the local second-hand market. The Perkins Appliance Co., Springfield, gears, bought some of the Government equipment. Japanese interests have bought a general line of second-hand tools, including planers, shapers and drilling machines, the total purchase involving about $700,000. South American, as well as Japanese interests, are scouring New England for textile machinery. One South American order for $300,000 of this machinery is to be delivered one year and three months from to-day. Deliveries on Japanese purchases in some instances start in 1921. This buying explains in a large measure the activity of the New England textile machinery market and the demand from the manufacturers for machine tools.

Some makers of cranes, electric hoists, etc., have indicated to local representatives that quotations will be advanced on or about March 1. Prices on cranes to-day are nearly on a level with those late in 1917, or just before the Government made an adjustment in steel plate quotations. The General Electric Co., Lynn, bought a 30-ton crane for its Everett steel foundry and has numerous other inquiries out. The Niles-Bement-Pond Co. was low bidder on a 10-ton crane and the Milwaukee Crane Mfg. Co. low on a 5-ton for the Charlestown Navy Yard, Boston, which have not been awarded as yet. Several crane negotiations are expected to be closed within a week.

The General Electric Co., Lynn, the past week placed some large orders for lathes, power presses, radial drills, etc., against its 1920 requirements, most of the tools being for newly acquired plants in various sections of New England. The United Shoe Machinery Corporation, Boston, has a long list out, which does not include anything for its European connections, and has done some buying against this. The directors of the Worthington Pump & Machinery Corporation have voted to hold up the 1920 machine-tool budget, for a time, at least, but it is possible that several planers, which are urgently needed, will be bought within the near future. The Boston & Albany Railroad is expected to publish its 1920 list shortly after the carriers have been returned to private ownership. Murray & Tregurtha Co., Quincy, Mass., has a long list of tools out, but is buying through a local dealer. The Crompton & Knowles Loom Works, Worcester, has been buying single machines for its Providence plant. The Ludlow Mfg. Associates, Ludlow, and the Chapman Valve Mfg. Co., Indian Orchard, Mass., have been interested in various kinds of tools, and the Rogers Drop Forging Co., Worcester, Mass., is negotiating for a large hammer. There is excellent buying of single grinding machines, both large and small, as well as lathes, from garage owners. The Walworth Mfg. Co., Boston, recently purchased a small amount of equipment, and the Boston Gear Works, Norfolk Downs, Quincy, Mass., two production tools. The Western machine tool builders who recently looked at a competitor's large machine operate near Boston closed a deal for one which cost considerably in excess of $20,000. The Crowfoot Gear Works, Inc., Cambridge, Mass., has placed orders for equipment for its new plant, and is now practically covered. The American Tap & Die Co., Greenfield, Mass., purchased tool room and production machines, and Chadwick & Trefethen, Portsmouth, N. H., manufacturers of Critchley reamers, also bought production tools and are out of the market at present. The Gale-Sawyer Co., South Weymouth, Mass., small tools, bought some equipment. It is sold ahead many months and is negotiating for two new plants. The Paragon Gear Co., Taunton, Mass., manufacturing transmissions for marine engines running up to 400 hp., has a large amount of business on its books and has just placed an order for a complete air chuck outfit. Richard Westcoat is in charge of the plant, which is a part of the Evans Stamping & Plating Co. The Taunton Spindle Co., Taunton, Mass., recently bought a small amount of equipment and is out of the market. The company's chief business heretofore has been spindles, but it is now devoting most of its time to forged tool bits. As soon as the weather permits the plant will be raised two feet from its present elevation and a forge shop will be built.

The William P. McCorkindale Co., Holyoke, capitalized for $25,000, has taken a Massachusetts charter to manufacture a patent napkin folder and holder for stores and restaurants.

Work is about to start on a two-story addition, 30 x 40 ft., to the plant of the Chase Metal Works, Waterbury, Conn., copper rings and brass tubing.

The Bullard Machine Tool Co., Fairfield, Conn., contemplates the erection of a forge shop, 70 x 208 ft., and a two-story administration building, 60 x 200 ft., to cost approximately $175,000.

The General Electric Co., Lynn, has awarded a contract for a new plant at Windsor, Conn., work to begin as soon as the weather permits.

The Century Machinery Co., washing machines, has changed its principal place of business from Springfield to Holyoke.

The machine tools and mechanical equipment of the J. N. Lapointe Co., Main Street, Hudson, Mass., will be sold at public auction at 11 a. m., Feb. 26, by J. E. Conant & Co., Lowell, Mass. It originally was intended to sell the machine tools through a Boston house.

A contract will be let at an early date by the United Illuminating Co., Bridgeport, Conn., for a $3,000,000 power plant which it is hoped to have completed in the late spring.

The Standard Steel & Roller Bearing Co., Plainville, Conn., contemplates the erection of another addition in the spring. It will be one-story, with saw-tooth roof. Hugh Rockwell is general manager.

As soon as the fire loss is adjusted for damage recently suffered to its present plant, the Hartford Iron Works, East Hartford, Conn., contemplates the erection of a new plant on another site, details for which will be announced later.

The Acme Special Machine Mfg. Co., Hartford, Conn., has been incorporated with a capital of $26,500 by E. R. Seifert, F. K. Landa and Solomon Eisner, 902 Main Street, to manufacture automotive equipment and special machinery.

The William H. Haskell Machine Co., Pawtucket, R. I., has cleared the site on Main Street to be used for an addition, 81 x 123 ft., and foundation work will begin at once.

The Union Horse Nail Co., New Haven, Conn., has increased its capital stock from $300,000 to $780,000.

The Hall Ignition & Mfg. Co., Windham, Conn., has been incorporated with a capital stock of $50,000 by G. J. Hall, Windham; I. S. Sterry and F. C. Sterry, Norwich, to manufacture ignition equipment for automobiles.

The Board of Fire Commissioners, Hartford, Conn., is considering plans for the erection of a new machine shop for municipal service, to cost about $125,000. Negotiations are under way for a site on John Street.

The Curtis & Curtis Co., 90 Garden Street, Bridgeport, Conn., manufacturer of pipe threading and cutting machinery, has increased its capital from $200,000 to $1,200,000.

The Hartford Electric Light Co., Hartford, Conn., is completing plans for a new two-unit electric generating plant in the South Meadows District. The first unit will be three-stories, 200 ft. in length. The Stone & Webster Engineering Co., Milk Street, Boston, Mass., is engineer.

The Scovill Mfg. Co., Waterbury, Conn., has filed plans for a one-story addition to cost about $5,500.

The Connecticut Bearing Co., Inc., New Haven, Conn., has been incorporated with a capital stock of $20,000 by F. C. Bradley, 505 Whalley Avenue, New Haven; H. M. Kenyon and T. H. Hall, Westerly, R. I., to manufacture ball bearings and other metal products.

The Waterville Mfg. Co., Waterville, Me., manufacturer of metal products, is having plans prepared for a one and two-story addition, 65 x 300 ft.

A new concrete block manufacturing plant on Baker Street will be erected by the Simbroco Co., 161 Devonshire Street, Boston, Mass., and considerable machinery will be required. It will be one-story, 60 x 200 ft., and is estimated to cost $70,000.

The Storms Drop Forging Co., Springfield, Mass., has been incorporated with a capital stock of $550,000 by Frank F. Storms, Charles H. Leonard and J. H. Jones, to manufacture drop forgings. Mr. Storms will act as president of the company, which proposes to establish a local works.

The Woods Hardware Specialties Corporation, Greenfield, Mass., has been incorporated with a capital stock of $99,000 by Albert E. Taylor, John L. Eppler and Edward D. Woods, to manufacture hardware and metal products.

Milwaukee

MILWAUKEE, Feb. 23.

The demand for machine tools continues and with traffic conditions growing more unfavorable on account of the acute shortage of cars and slow movement of freight deliveries are becoming serious factors. Unfilled orders are accumulating in a manner unheard of since the close of the war.

The Milwaukee Electric Railway & Light Co., Milwaukee, has awarded the general contract for the construction of a steam generating works estimated to cost $500,000 equipped, with the Northwestern Bridge & Iron Co., Milwaukee. It will be the first unit of a plant projected at a cost of $7,500,000, to be known as the Lakeside plant, and located between St. Francis and Cudahy. It is to furnish current to existing and new industries in the district.

The W. J. Pine Machine Co., Kenosha, Wis., manufacturer of machine tools and machinery for wire-working, has acquired the buildings and real estate which it has occupied since its establishment a year ago when it took over the business of the Lippert & Rhenstron Co. It is planned to erect a machine shop addition in the spring and summer to increase particularly the production of machines for bed springs. W. J. Pine is president and general manager.

The Northern Furniture Co., Sheboygan, Wis., has decided to electrify its entire plant, and the additions now under construction, and will install a new Ames uniflow engine direct-connected to a General Electric generator. Otto Knabe, formerly superintendent Eastern Wisconsin Electric Co., Sheboygan, is chief electrical engineer. Edward Hammett is general manager.

The Carl Pick Co., West Bend, Wis., has been incorporated with an authorized capital stock of $75,000 to manufacture universal joints and other automotive parts and material. The former factory of the West Bend Aluminum Co. has been taken over and will be remodeled and equipped with new machinery, for which inquiry is now being made. John Wittmann, Milwaukee, will be works manager and chief engineer

The Waukesha Foundry Co., Waukesha, Wis., has awarded the general contract to the Federal Bridge & Structural Co., to design and construct a brick and steel shop addition, 50 x 195 ft., estimated to cost $60,000 including equipment. It specializes in gray iron castings. F. J. Barker is secretary.

The Bergstrom Stove Co., Neenah, Wis., manufacturer of stoves and ranges, has increased its capital stock from $125,000 to $150,000.

L. F. Scheppke, Sparta, Wis., has plans for a garage and service building, 100 x 150 ft., part two stories and basement, of which 50 x 90 ft. will be equipped as a machine shop.

The Petersen-Billker Tool & Mfg. Co., Milwaukee, has been chartered to manufacture tools, dies, jigs, fixtures, and to do a general machine shop business. The capital stock is $25,000 and the incorporators are Hans Petersen, Fred Billker and Felix Mayer, 419 Eleventh Avenue.

William Michler and Albert Zastrow of Fond du Lac, Wis., have formed a partnership as the Michler-Zastrow Co. to conduct a general welding and machine repair works at 51 West Second Street. Oxy-acetylene welding and cutting apparatus has been purchased.

The Eastman Mfg. Co., Manitowoc, Wis., has been organized with a capital stock of $25,000 to manufacture brass hose couplings and other brass and bronze specialties. The incorporators are J. P., C. C. and H. L. Eastman.

The Walking Tamper Co., Wausau, Wis., has been incorporated with a capital stock of $100,000 by Patrick T. Stone, D. E. Sauerhering and W. W. Albers, to manufacture metal devices for tamping silo filling and other implements and machinery designed mainly for farm use.

Conrad Milhaupt, Appleton, Wis., has incorporated his machine shop and forge business as the Milhaupt Spring & Automobile Co., with a capital stock of $40,000. Edgar A. and Leo P. Milhaupt are also incorporators. An addition is being completed which will be equipped to manufacture vehicle springs and other automotive materials and parts.

The Modern Tool & Machine Works, Milwaukee, has been incorporated by Walter E. Fanrick, F. W. Kindt and Henry J. Bendinger, attorney, 425 East Water Street, to operate a commercial machine shop and manufacture tools and machinery. The capital stock is $20,000.

The Automatic Welding Co., Menominee, Mich., has disposed of the exclusive rights to the use of the Lloyd oxy-acetylene patents and machinery for manufacturing steel tubing in Canada to the Standard Parts Co., Cleveland, which operates a branch plant at Woodstock, Ont.

The Brandt-Froelich Co., Appleton, Wis., distributer and dealer in automobiles, motor trucks and power farm operating machinery, is taking bids for the erection of a $65,000 sales and service building, 80 x 166 ft., two stories and basement. A complete machine shop will be equipped.

The William Hyink & Sons Co., Milwaukee, has been incorporated with a capital stock of $50,000 to manufacture metal-working machinery and conduct a general machine shop business. The incorporators are Lawrence Gazena and William Hyink, Sr., for many years a member of Treichel & Hyink, machinists, 727 North Water Street.

OFFICE CHANGES

The New York district sales office of the Chesapeake Iron Works, Baltimore, has removed from the seventh floor of the Woolworth Building, 233 Broadway, to larger space on the fiftieth floor. H. L. Mode is the New York sales representative.

Changes in oil burner service stations of the Hauck Mfg. Co., Brooklyn, N. Y., have been made as follows: The Pittsburgh office has been moved to 105 Wood Street, where there is a large display window; the station at Boston has been moved to 149 Berkeley Street, corner of Columbus Avenue, where there is a large display window, store, office and space for demonstration; the Cleveland station has been moved to 1106 Walnut Avenue.

The Black & Decker Mfg. Co., drill manufacturer, Towson Heights, Baltimore, announce the establishment of a permanent office and show room at 1436 S. Michigan Avenue, Chicago, in charge of R. G. Ames, whose territory has been extended to cover the entire Mid-West. F. E. Marrion and J. N. LaBelle will assist Mr. Ames, Mr. Marrion taking charge of the missionary work and Mr. LaBelle being located permanently at the Chicago office.

Thompson Brothers, engineers and machinists, have removed to 512-522 Buttonwood Street, Philadelphia.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	4.50c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 4.25c.
1 to 6 in. x ⅜ to 1 in.	3.52c. to 4.25c.
1 to 6 in. x ¼ to 5/16	3.62c. to 4.35c.
Rods—⅝ and 11/16	3.57c. to 4.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 5.25c.
Hoops	4.47c. to 5.50c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 4.25c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 4.25c.
3 in. x 3/16 in. and ⅛ in.	3.72c. to 4.60c.
1½ to 2½ in. x ⅛ in.	3.52c. to 4.40c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 4.35c.
1 to 1¼ in. x 3/16 in.	3.52c. to 4.40c.
1 to 1¼ x ⅛ in.	3.57c. to 4.45c.
⅞ x ⅞ x ⅛ in.	3.62c. to 4.50c.
¾ x ⅛ in.	3.67c. to 4.55c.
⅝ x ⅛ in.	4.07c. to 5.35c.
½ x 3/32 in.	5.17c. to 6.05c.
Tees:	
1 x ⅛ in.	3.87c. to 4.75c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 4.65c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 4.45c.
3 in. and larger	3.52c. to 4.30c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	3.52c. to 4.25c.
Toe calk, ½ x ⅜ in. and larger	4.60c. to 4.85c.
Open-hearth spring steel	7.00c.
Standard cast steel, base price	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 4.50c.

Sheets

Blue Annealed

	Per lb.
No. 10	5.07c. to 6.25c.
No. 12	5.12c. to 6.30c.
No. 14	5.42c. to 6.35c.
No. 16	5.52c. to 6.45c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	6.80c. to 8.80c.	
Nos. 22 and 24	6.85c. to 8.85c.	9.80c.
No. 26	6.90c. to 8.90c.	9.85c.
No. 28	7.00c. to 9.00c.	10.00c.
No. 30	7.10c. to 9.10c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	7.25c. to 9.00c.
No. 16	7.50c. to 9.25c.
Nos. 18 and 20	7.65c. to 9.40c.
Nos. 22 and 24	7.80c. to 9.55c.
No. 26	7.95c. to 9.70c.
No. 27	8.10c. to 9.85c.
No. 28	8.25c. to 10.00c.
No. 30	8.75c. to 10.50c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—36	—19	¾-1½ in. Butt.	—18	+2
¾-3 in. Butt.	—40	—24	2 in. Lap.....	— 9	+9
3½-6 in. Lap.	—35	—20	2½-6 in. Lap..	—11	+6
7-12 in. Lap..	—25	— 8	7-12 in. Lap...	+ 2	+20

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per lb
Bright basic	8.00c.
Annealed soft	8.00c.
Galvanized annealed	8.50c.
Coppered basic	8.50c.
Tinned soft Bessemer	10.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

Base Price	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29½c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$9.80	$9.55
		90 lb...	9.90	9.65
		100 lb...	10.00	9.75
IC...$15.00	$13.00	IC...	10.25	10.00
IX... 17.25	15.00	IX...	11.25	11.00
IXX... 19.00	16.75	IXX...	12.25	12.00
IXXX... 20.75	18.50	IXXX...	13.25	13.00
IXXXX... 22.25	20.25	IXXXX...	14.25	14.00

Terne Plates

8-lb. Coating 14x20

100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	64c.
Bar	68c. to 73c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19½c. to 20c.

Spelter and Sheet Zinc

Western spelter	10½c. to 11½c
Sheet zinc, No. 9 base, casks	14c. open 14½c.

Lead and Solder*

American pig lead	9¾c. to 10½c.
Bar lead	10½c. to 11 c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c.
Commercial grade, per lb	50c.

Antimony

Asiatic	12¾c. to 13½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb...35c. to 38c.

Old Metals

Although the market is quiet, there is a little better feeling because of the apparent upward tendency of new metal. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible	16.50
Copper, heavy and wire	15.75
Copper, light and bottoms	14.00
Brass, heavy	10.00
Brass, light	7.50
Heavy machine composition	15.50
No. 1 yellow rod brass turnings	9.50
No. 1 red brass or composition turnings	12.75
Lead, heavy	7.25
Lead, tea	4.75
Zinc	5.25